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***JOINT FORCES STAFF COLLEGE***

**JOINT ADVANCED WARFIGHTING SCHOOL**



**OPERATE TO KNOW: AN OPERATIONS AND INTELLIGENCE DESIGN  
FOR THE OPERATIONAL LEVEL OF WAR**

**by**

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A paper submitted to the Faculty of the Joint Advanced Warfighting School in partial satisfaction of the requirements of a Master of Science Degree in Joint Campaign Planning and Strategy. The contents of this paper reflect my own personal views and are not necessarily endorsed by the Joint Forces Staff College or the Department of Defense.

This paper is entirely my own work except as documented in footnotes.

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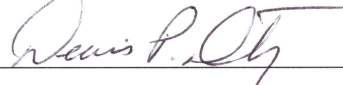
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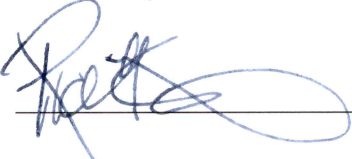
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## **ABSTRACT**

The thesis of this paper is that if the United States and its allies are to fight and win decisively against the complex adaptive adversaries of the twenty-first century, then knowing must become a primary operational activity. Intelligence must ascend from its diminished status to an equal pillar of action with operations, resourced and organized with equipment, processes, and intellectual skills to produce a continuous picture of the enemy and environment tied to forces that can rapidly exploit opportunities to generate more intelligence. The joint force faces a global security environment where adversaries neutralize American superiority in fire and maneuver by hiding and remaining untargetable—especially by avoiding open battle. Adversaries seek to make the environment inhospitable for U.S. forces—driving them to fortified enclaves, marginalizing their influence, and placing them on the defensive. In this environment, the joint force must function differently: pulsing to understand the environment, then taking decisive action while being able to pace the intensity of operations to allow off-ramps for other instruments of national power to take the lead to meet national objectives. This thesis recommends the development of a joint operating concept that establishes the foundation for an aggressive knowing capability consisting of active observation with pulsing and continuous diagnostic feedback to create a continuous receive-respond, collect-pulse connection between intelligence and operations to pry, test, understand the environment, and then take decisive action.



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## **CHAPTER 1: INTRODUCTION**

This thesis attempts to answer the following question: how should operations and intelligence at the operational level of war evolve to match the changing character of conflict in the twenty-first century? In answering this question, this thesis recommends the development of a joint operating concept that establishes the foundation for an aggressive knowing capability consisting of active observation with pulsing and continuous diagnostic feedback to create a continuous receive-respond, collect-pulse connection between intelligence and operations to enable dynamic military decision-making.

The thesis of this paper is that if the United States and its allies are to fight and win decisively against the complex adaptive adversaries of the twenty-first century, knowing must become a primary operational activity. Intelligence must ascend from its traditionally subordinate status to an equal pillar of action with operations, resourced and organized with the equipment, processes and intellectual skills to produce a continuous picture of the enemy and environment, tied to forces that can rapidly exploit emergent opportunities to generate more intelligence. This in turn shapes and develops the battlespace to give the joint force commander opportunities to exploit weaknesses and create decision space for national leadership.

To support the central thesis, the paper first reviews the emergence of the World War II (WWII) German Wehrmacht's war of maneuver, an operational-level combined arms system that profoundly altered warfare at its time, and today forms the cornerstone of U.S. warfighting doctrine. The historical review identified the seeds of today's joint offensive-oriented doctrine that, like the Wehrmacht, favors aggressive operational fire

and maneuver over nonphysical capabilities such as intelligence. The German Wehrmacht, however, despite its achievement in restoring operational offensive warfare when the technologies and doctrine of the day favored the defense, failed to balance its physical and nonphysical military capabilities because of the disdain towards intelligence by the officer corps, the exaggerated role of the commander in decision-making, and the cult of decisive operations. The WWII German form of decisive warfare and the diminished status of intelligence imprinted on U.S. and Western armies after the war and continues today within the joint force. Next, the thesis outlines how today's deductive-reductionist doctrinal approaches, some inherited from German decisive warfare theory, are inadequate for understanding complex adaptive situations that are shaping warfare in the twenty-first century. The study shows how inductive-holistic approaches informed by complexity science and chaos theory provides better insights into the operational environment than deductive-reductionist based planning and execution processes espoused by joint doctrine today.

Complexity science and chaos theory provide an outline for how to implement induction by showing ways to actively pulse (broad and narrow) and conduct near real-time diagnostics to enable continuous decision-making. Pulsing and feedback are not new, but absent the equipment, processes, and intellectual skills to enable operations and intelligence to produce a continuously updated enemy situation picture and then act, these efforts remain ad hoc and unsustainable measures that will provide minor advantages in future contingency and conflict. Implementing inductive approaches may provide what is needed to restore decisive operational offensive warfare in an era where the advantage

has again shifted to the defense because of anti-access/area denial tactics and technologies.

The study then offers an outline of the Operate to Know (OtK) concept. OtK is an inductive-based operations and intelligence concept to operationalize pulsing, feedback, diagnostics and decision-making into a single cohesive operating concept for the joint force to pursue to restore the decisive nature of operational warfare. Borrowing heavily from complexity science and contemporary military applications of complexity principles, the OtK emphasis on sensing, pulsing, feedback, and near-real time diagnostics emerge as vital capabilities for the twenty-first century joint force. Operate to Know seeks to balance nonphysical capabilities with physical ones and place intelligence and operations as equal pillars of action emphasizing a bias for knowing over a bias for doing. A key element of this framework is using nonphysical and physical means to soak, pulse, and analyze for precise action while simultaneously providing decision space for policy makers. OtK is a model for *thinking, feeling, prodding*, more *thinking*, and *acting* and then doing it over again—continuously throughout an operation or campaign.

The final chapter serves as the capstone for the thesis by synthesizing many of the main concepts using the Allied 1942 raid on Dieppe. As a case study, Dieppe has two parts, the 1942 version and a modern version. From the linear-deductive perspective, Dieppe in 1942 is a story of a massive military catastrophe. Military achievements are virtually nonexistent—the raid is costly, unsuccessful, and highly embarrassing. Seen from a non-linear, inductive-holistic view, the super raid offers insights of an emerging form of warfare, a mode that is highly matched to complex system observation, feedback, and adaption. From this perspective, Dieppe offers a glimpse of what is possible today.

By updating the Dieppe scenario with modern equipment, knowing processes, and intellectual skills, the outline for a purposeful knowing effort emerges—a line of operation or effort known as systemic knowing. The updated Dieppe scenario illustrates how OtK can become a starting operating concept for experimentation to fit together the many disparate concepts and technologies for nonphysical finding and knowing from the investments in Operations IRAQI FREEDOM and ENDURING FREEDOM into a single, cohesive warfighting capability. The goal is to lift the nonphysical knowing function from its underweighted warfighting status to a balanced position with operations and conjoin operations and intelligence together in a synergistic system: operations to deliver appropriate actions that cause the adversary to become visible and intelligence to detect, locate and integrate learning and knowledge into the system via a continuous enemy situation picture.

The Dieppe chapter specifically addresses the thesis of this paper: in order to fight outnumbered with less overall combat power than the adversary and deliver decisive operational success, rapidly with few casualties, joint forces must organize to comprehensively *know* the environment, rapidly *find* the low-signature enemy, and fully *integrate* this knowledge into rapid decision-making. Similar to the way the operational integration of the radio, the mechanized vehicle and the airplane ushered in tactical and operational breakthroughs in WWII, the balancing of nonphysical intelligence and physical force offers important new capabilities to counter hidden adversaries and asymmetric responses to U.S. modes of warfare, and reopens opportunities for decisive operations.

Like all initiatives that argue for upending current architectures and replacing them with different ones, the OtK ideas and arguments require careful review to avoid premature rejection and to ensure they are valid. During the innovative interwar period in Germany, military thinkers experimented with a number of new technologies and concepts. A main check of their work was an institutional self-regulating awareness, cautioning against ideas deemed *esoteric* and *professionally dangerous*.<sup>1</sup> In their view, balance and synthesis were important. The German military class avoided *Einseitigkeit*<sup>2</sup> or one-sidedness, rejecting schemas or formulas that placed a piece of equipment or warfighting concept above any other and instead looked to integrate different capabilities to create a synthesis which would deliver capability that was more than the sum of the single components.<sup>3</sup> The German military establishment took this approach as it integrated new technology and equipment such as the tank and the airplane into their way of war. The Germans applied great energy in balancing military capabilities and avoiding the lure that overtook the Allies of overweighting certain capabilities over others, such as the primacy of airpower and tanks over infantry or each other.<sup>4</sup>

In a similar manner, this thesis seeks to initiate further discussion regarding the value of the OtK concept that balances intelligence with operations as equal instruments in warfare in contrast to today's diminished specialist standing that offers only rudimentary intelligence capabilities. This paper will leave it to the reader to determine

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<sup>1</sup> Robert M. Citino, *Quest for Decisive Victory: From Stalemate to Blitzkrieg in Europe, 1899-1940* (Lawrence, KS: University Press of Kansas, 2002), 255.

<sup>2</sup> Robert M. Citino, *Blitzkrieg to Desert Storm: The Evolution of Operational Warfare* (Lawrence, KS: University Press of Kansas, 2004), 21.

<sup>3</sup> Ibid., 255.

<sup>4</sup> Citino, *Quest for Decisive Victory*, 194.

whether the conclusions drawn from OtK are of value to the present situation or are instead one-sided and esoteric.

## CHAPTER 2: THE ROOTS OF THE CURRENT OPERATIONS AND INTELLIGENCE IMBALANCE

### The German Way of War

The German Wehrmacht of WWII, despite its crushing defeat in 1945, is regarded by military scholars as having been one of the more effective and decisive operational level fighting forces in history.<sup>1</sup> Long before the victories of WWII, the German way of war was already well established.<sup>2</sup> German officers viewed the operational level of war as the preeminent way to fight and win.<sup>3</sup> Battles mattered only in as much as they contributed to a swift defeat of the enemy army. The *schwerpunkt*, or decisive point of their theory of operational campaigning, was always the enemy's main force—the focus was the annihilation of the enemy's field army. Little else mattered. German operational success sprung from a culture of aggressive action enabled by a decentralized, almost independent command style that left it to the commander to achieve or solve a mission as he believed or felt.<sup>4</sup>

The Germans designed an operational-level maneuver concept that sought annihilation in a single crushing blow.<sup>5</sup> Exhausting, protracted wars of position were not in the German interest because it could not fight and win a war of materiel—Germany did not have the manpower or resources to win a war of attrition against its much larger

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<sup>1</sup> Trevor N. Dupuy, *Understanding War: History and Theory of Combat* (New York: Paragon House, 1987), 109-114, 281.

<sup>2</sup> Citino, *Blitzkrieg to Desert Storm*, 20-21.

<sup>3</sup> Ibid., 8.

<sup>4</sup> Robert M. Citino, *Death of the Wehrmacht: The German Campaigns of 1942* (Lawrence, KS: University Press of Kansas, 2007), 4.

<sup>5</sup> Ibid., 4.



adversaries.<sup>6</sup> Germany needed to achieve decisive results quickly, then regroup and do it over again creating an operational package that could destroy a considerable portion of an enemy force's fighting power in the fastest and least costly way.<sup>7</sup> To create this form of warfare, the Germans merged three hundred years of warfighting tradition—"the Prussian army always attacks"—with new equipment to create a capability that no other force at that point in history could handle.<sup>8</sup>

Germany shattered the deadlock of World War I (WWI) static warfare by introducing to the world a remade war of movement or *bewegungskrieg*. Fusing their way of war with the equipment of the airplane, mechanized forces and radio into a single, cohesive warfighting system, the war of movement changed warfare dramatically in the opening campaigns of WWII. This unanticipated form of highly effective operational-level maneuver burst upon the out-of-date armies of Europe in a devastating shock wave from combined arms German Panzer Armies that could not be stopped.<sup>9</sup> Defending front line troops, confident and expecting to repulse attacking Wehrmacht forces using the defensive techniques that had prevailed in the trench lines of WWI, simply disappeared under the weight of the fast-paced air and ground combined arms attack. Unlike in WWI, where forces were locked in a bitter struggle along a lengthy two hundred and forty mile front of static, positional, attrition fighting, the Germans used the speed and firepower of combined arms mechanized forces to break out of a war of position or *stellungskrieg* and

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<sup>6</sup> Citino, *Blitzkrieg to Desert Storm*, 73.

<sup>7</sup> Robert M. Citino, *The Wehrmacht Retreats: Fighting a Lost War, 1943* (Lawrence, KS: University Press of Kansas, 2012), 16.

<sup>8</sup> Ibid., 17.

<sup>9</sup> Ibid., 1.

fight its traditional way of rapid movement and encirclement.<sup>10</sup> The sharp breakout at a point of penetration was only the first part of a German operation. Their goal was not just to pierce the defensive line and get behind their enemy's forces to wreak havoc. The goal was to blast through the defensive line, maneuver multiple units around the flank, surround the enemy in coordinated concentric attacks and *kessel*, or create a pocket of the main enemy that it blocked on all sides and annihilated from the air and ground.<sup>11</sup>

There was something hazardous about this form of German warfare that became visible over time.<sup>12</sup> As exhilarating as fast-paced shock maneuver was, it left behind battlefield detritus, untidy loose ends that returned after the campaign to bleed German forces until it brought about their defeat.<sup>13</sup> Of course, there were the bypassed forces that required sizeable mop-up operations to clear out. More dangerous still were the regular forces that escaped and melted into the terrain to fight in irregular fashion later. But the most dangerous were the armies that adapted and refused to give battle on German terms and denied the maneuver to achieve a *kessel* of consequence—essentially denying the operational maneuver its purpose. In the Balkans campaign of 1940, German forces defeated the Yugoslav military forces in nine days but never achieved a knockout punch and most of the army went into the mountains to fight an irregular war for the next five years.<sup>14</sup> What set the German army up for defeat was when the Wehrmacht was not able

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<sup>10</sup> Citino, *Death of the Wehrmacht*, 7.

<sup>11</sup> Ibid., 4.

<sup>12</sup> Ibid., 27.

<sup>13</sup> Citino, *The Wehrmacht Retreats*, 27.

<sup>14</sup> Citino, *Death of the Wehrmacht*, 25-27.

to achieve a decisive defeat of the enemy army in the opening salvos of conflict and these forces learned to adapt to German warfare.<sup>15</sup>

The Soviets and British adjusted to the German war of movement by employing new tactics to absorb the knockout punch and avoid the *kessel*. Even after repeated unsuccessful attempts, the Germans kept trying for a breakout success looking for a way using their war of movement to turn a defensive war back to maneuver by re-running the *kessel* play.<sup>16</sup> In the end, they achieved very little. Instead, these unsuccessful and costly maneuvers produced *luftoss*, or pockets full of air, empty of forces. The Soviets adapted to the German *kessel* play, then applied the same operational approach against the Germans from 1943-1945.<sup>17</sup>

### **Operating Blind. Intentionally.**

The Wehrmacht and the entire German military system did not have much of a role for military intelligence because the German military tradition rested firmly in its long-standing way of war of fast-paced mobile campaigning leading to encirclement and annihilation—the will of the commander and aggressive maneuver were the decisive elements.<sup>18</sup> During the interwar period, the Germans created a form of warfare expertly tuned to German fighting traditions. The Germans called it *kurtz* and *vives*—rapid and decisive operational victory with few casualties while fighting outnumbered and against forces with more overall combat power.<sup>19</sup> For all the merits of the German way of war,

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<sup>15</sup> Citino, *Death of the Wehrmacht*, 18.

<sup>16</sup> *Ibid.*, 9.

<sup>17</sup> *Ibid.*, 177-178.

<sup>18</sup> *Ibid.*, 32.

<sup>19</sup> *Ibid.*, 4.

especially restoring the offense in an age where the weapons of war favored the defense, it operated blind in the offense and mostly blind in the defense. Neglecting intelligence was not an inadvertent oversight, but the product of arrogance.<sup>20</sup> The Germans purposely underweighted intelligence in every aspect of warfare and it played a diminished role in their military operations because of the unique German culture of war that overwhelmingly weighted its capabilities toward maneuver and the will of the commander and regarded intelligence as a minor specialist function.<sup>21</sup>

At the operational level, intelligence provided targeting details on where major forces were so they could be sought out and destroyed.<sup>22</sup> But in almost every category of pre-invasion intelligence preparation, such as determining the disposition, size, capability, effectiveness, intentions, and estimates of how an enemy army would respond, German intelligence judgments were not just imprecise, but many times irresponsibly inaccurate.<sup>23</sup> German confidence in its warfighting capability was so overwhelming that the Wehrmacht became viewed as a machine that just needed to be pointed in a general direction and energetic operations, driven by the will and insight of the commander, would resolve whatever was placed in its way.<sup>24</sup>

An example of the Wehrmacht's disinterest in intelligence details is when the Wehrmacht launched Operation BARBAROSSA, the invasion of Russia in June 1941. Before the invasion, Germany believed it was facing 200 Soviet divisions with a total

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<sup>20</sup> David Khan, *Hitler's Spies* (Lexington, KY: DeCapo Press, 2000), 524. Robert M. Citino, *Blitzkrieg to Desert Storm: The Evolution of Operational Warfare* (Lawrence, KS.: University Press of Kansas, 2004), 48.

<sup>21</sup> *Ibid.*, 532

<sup>22</sup> *Ibid.*, 380.

<sup>23</sup> *Ibid.*, 387.

<sup>24</sup> *Ibid.*, 446.

overall strength of two million fighting men.<sup>25</sup> German Supreme High Command of the Army (OKH) initially estimated the Wehrmacht would face 3,500 Soviet tanks then revised its estimate to 10,000 with the caveat that not all were in European Russia.<sup>26</sup> OKH also estimated that the Soviets had 10,500 airplanes of different makes models and that 7,500 were serviceable.<sup>27</sup> In fact, these estimates were so distinctly wrong that German commanders, after the first months of fighting, remarked about how grossly they had underestimated Soviet strength.<sup>28</sup> In terms of divisions and total personnel, the Soviets had 360 divisions and over five million men in arms.<sup>29</sup> Their ground forces consisted of 24,000 tanks including the T-34 tank, unknown to the Germans before the campaign, which wreaked havoc because of the power of its main gun and near invincible armor.<sup>30</sup> Their air force was massive with nearly 18,000 airplanes at the start of the invasion.<sup>31</sup> The Germans believed the Soviets would surrender after the Wehrmacht annihilated Soviet front-line forces just as other armies the Germans had fought and destroyed had done.<sup>32</sup> In the overconfidence of their own military prowess the Germans underestimated the massive manpower and equipment capability of the Soviets, the modernization of the Soviet Air Force, the evolving Soviet doctrine and the manufacturing and resource base the Soviets would call upon to fight a war of materiel.<sup>33</sup>

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<sup>25</sup> Khan, *Hitler's Spies*, 459.

<sup>26</sup> Ibid., 457.

<sup>27</sup> Ibid., 458.

<sup>28</sup> Ibid., 460.

<sup>29</sup> Ibid., 459.

<sup>30</sup> Ibid., 458.

<sup>31</sup> Ibid., 458.

<sup>32</sup> Ibid., 461.

<sup>33</sup> Ibid., 458-460.

In the smaller countries of Europe and France, the intelligence picture was better developed because units were arrayed either along borders or in forts. The Soviet Union was a far more difficult intelligence problem and the lack of reliable information resulted in major underestimates of Soviet capabilities. However, even if the estimates had been accurate, the faith of the German way of war was so strong that numbers and distance did not alter battle planning.

In the German view, men, firepower, and maneuver won battles; they were the decisive elements of war.<sup>34</sup> To the Wehrmacht, intelligence had little effect on war, it was not a necessary precondition for victory, and it distracted attention from important issues and interfered with planning.<sup>35</sup> This line of reasoning endured for generations in the German army and an appreciation for what intelligence could do was not gained until later in WWII, but by then it was too late. Advanced, heavily offense-oriented militaries with deep traditions of aggressive, offensive action often favor physical military power and place minimal emphasis and attention on nonphysical functions such as intelligence. German intelligence was intentionally made a minor element of military power because of three institutional factors—the disdain by the officer corps toward intelligence, the exaggerated role of the commander in decision-making, and the cult of the decisive operation.

### **The Intelligence Specialist Functions Subordinate to Operations**

German officers, raised in a tradition where they were to attack first and think later, valued an intuitive style of fighting over deliberative approaches. Speed of action

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<sup>34</sup> Khan, *Hitler's Spies*, 399.

<sup>35</sup> Ibid., 400.

was paramount. According to Field Marshal Bock, a good German officer should spend more time moving than thinking and in tough times “the crisis was to be solved by offensive means.”<sup>36</sup> The German army was not anti-intellectual, rather the intellectual parts were already firmly built in; it was up to the individual officer to execute. If an officer failed to act, moved too slowly, spent too much time thinking, and then lost, history would judge him poorly.<sup>37</sup> From this philosophical position emerged the belief that specialist functions, such as intelligence, would bring to warfare undesirable qualities that could undermine the commander’s role as an intuitive operator central to the German way of war.

Thus, intelligence had to be controlled. Special staffs using technical means to piece together and offer judgments on the enemy were considered unnecessary in the early part of the war, viewed as a burdensome weight to carry, and their cost exceeded their worth.<sup>38</sup> The Wehrmacht placed the intelligence function (known as the 1c in the Wehrmacht organizational structure) under operations, subsuming it within operations (the 1a).<sup>39</sup> In many cases, the intelligence officer rarely met with the commander.<sup>40</sup> The 1c passed intelligence to the 1a and the chief of staff.<sup>41</sup> Commanders did not expect much from the intelligence work itself, which was rudimentary, entailing mostly statistical work such as accounting for enemy units and their size and disposition, and

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<sup>36</sup> Citino, *The Wehrmacht Retreats*, 155.

<sup>37</sup> Citino, *Death of the Wehrmacht*, 154.

<sup>38</sup> Khan, *Hitler’s Spies*, 533.

<sup>39</sup> *Ibid.*, 400.

<sup>40</sup> *Ibid.*, 533.

<sup>41</sup> *Ibid.*

was all a commander required.<sup>42</sup> The 1c rarely summed up the situation, much less articulated what it might mean. Estimating what the enemy was doing and was likely to do next was the job of the operations branch and for the commander to consider.<sup>43</sup> The commander received short information updates so he would have more time for more important work.<sup>44</sup> In staff conferences, the preference was always to reduce or cut out unnecessary information such as intelligence, weather forecasts, and elements that did not need elucidation.<sup>45</sup> If there was time, intelligence usually had five minutes to summarize the enemy picture and usually this consisted of raw facts on enemy disposition.<sup>46</sup>

### **Exaggerated Role of the Commander in Decision-making**

Guided by Frederick the Great, Carl Von Clausewitz, Field Marshal Helmuth von Moltke and years of combat experiences, the German way of war by WWII elevated the role and responsibility of the commander in battle. But the exaggerated role of the commander created an almost reckless situation where the commander's intuitive sense and operational acumen excluded other valuable inputs. As laid out in Regulation No. 300, *Troop Command*, the commander comprehended the situation based on his judgment of his own capabilities and the enemy force.<sup>47</sup> The instruction advised the commander to think as if he were in the enemy's shoes, to look for areas where the enemy could hinder or create the most damage to the plan.<sup>48</sup> Figuring out the enemy was

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<sup>42</sup> Khan, *Hitler's Spies*, 423.

<sup>43</sup> Ibid., 423.

<sup>44</sup> Ibid., 404.

<sup>45</sup> Ibid.

<sup>46</sup> Ibid.

<sup>47</sup> Ibid., 401.

<sup>48</sup> Ibid.



an assumed task—self evident to the commander—and it would come to him in bits and pieces and become more clear with air and ground reconnaissance all set in motion by the commander seeking contact with the enemy.<sup>49</sup>

As a result, the German commander did not use intelligence to conduct these tasks because it was part of the commander's function.<sup>50</sup> Figuring out the enemy in relation to the attack plan was the responsibility of the commander, not a subordinate staff officer.<sup>51</sup> The commander had to pierce the fog of war and then act on emergent opportunities.<sup>52</sup> The exaggerated role of the commander as the generalist who would comprehend everything through action and intuition resulted in the placement of little real responsibility on intelligence. Instead, operations ruled most everything. Operations penetrated the fog of war, operations clarified obscure situations, and the 1c simply filled in the details of a picture already developed by operations.<sup>53</sup> The 1938 German Regulation No. 92, *Handbook for General Staff Service in War*, reinforced the policy of a diminished view of intelligence: "The 1c is the assistant of the 1a in determining the intelligence picture."<sup>54</sup> In paragraph 16 the handbook outlined this role more clearly:

- The 1c is subordinated to the 1a and is his helper in working up the enemy picture
- Estimating the enemy picture is a matter for the commander in cooperation with the chief of staff or the 1a.
- The judgment of the enemy situation always proceeds from the command authorities, not from the 1c alone.<sup>55</sup>

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<sup>49</sup> Khan, *Hitler's Spies*, 401.

<sup>50</sup> Ibid., 404.

<sup>51</sup> Ibid.

<sup>52</sup> Ibid., 415.

<sup>53</sup> Ibid., 423.

<sup>54</sup> Ibid., 400.

<sup>55</sup> Ibid.

The German doctrinal view was that the commander was responsible for the overall picture not the specialist intelligence function. Not only was he to fight his unit, a task that consumed the majority of his time, he was to pierce the fog of war through his superior intellect and then use aggressive action to clarify the situation.<sup>56</sup> The Germans viewed uncertainty and chance in war as complex conditions, and “understanding, no matter how detailed could control them, no intellect could illuminate them—only the will of the commander could dominate them.”<sup>57</sup>

Well-trained and talented commanders and operations officers filled the ranks of the Wehrmacht, but the expectation that a commander could single-handedly absorb the immense array of combat information and know what to do, while controlling every detail of his own force, was beyond the capacities of even the most capable military officer. As conditions became more complicated, the commander inevitably overlooked important inputs. Commanders and their 1a’s often did not want interference with their preformed planning attack schema. The commander and the 1a placed all their attention to fighting the force and pushing the attack forward. The attack plan was everything, supplemented by an intuitive style of fighting that did not leave much time for considering intelligence details and an operational way of war that did not require intelligence to be effective.<sup>58</sup>

### **Cult of the Decisive Operation**

Surrounded on all sides by hostile adversaries with much larger populations and materiel bases, often conspiring in unison, Germany, by necessity, created a form of

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<sup>56</sup> Khan, *Hitler’s Spies*, 400.

<sup>57</sup> Ibid., 400-401.

<sup>58</sup> Ibid., 524.

warfare that fit its unique geopolitical condition. Short, decisive operations were essential because Germany could not win protracted, exhaustive conflicts of attrition. From this unique situation emerged the quest for the single decisive operation by taking the fight to the enemy by bold maneuver using better led, highly trained, motivated soldiers, employing superior tactics and equipment to drive operational attacks with little to no direction.<sup>59</sup> The German theory of war, articulated by Clausewitz and molded by WWII practitioners, maintained that the physical and psychological dimensions entwined in war. Modern technology allowed the Germans to employ their way of war through decisive operations.

The physical power of armored forces, blasting through a fixed defensive line on a narrow front and then appearing from behind and attacking from multiple positions, including from the air in well-coordinated concentric attacks, destroyed the psychological will of every major power Germany faced from 1939 to 1942. The physical and psychological effects became an obsession for German commanders, and other battle factors, especially intelligence, were unnecessary to achieving the German form of war. Thus, the commander's energy was spent on positioning the force and then fighting the plan. Arranging and controlling the attacking force were the preconditions that brought success and it was the will of the commander that gave it life and energy. Battle was the ultimate reconnaissance, only then did the enemy reveal itself and superior tactics, training, and leadership could overcome any situation.<sup>60</sup> Intelligence played a subordinate role. Not required and largely left out of offensive campaigning, intelligence sat dormant while operations planned and executed fast-paced combined arms maneuver.

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<sup>59</sup> Citino, *The Wehrmacht Retreats*, 25.

<sup>60</sup> Khan, *Hitler's Spies*, 400.

## **What did German Military Intelligence Look Like in War?**

Like all protracted wars, the practices and procedures of an army at the start of the war are very different from the ones used at the end. Enemy actions, new equipment, and lessons learned in combat trigger new operating procedures. German military intelligence practices, although rudimentary at the start of the war, by the end, changed substantially. Nevertheless, the operational bias that constrained German military intelligence at the start of the war prevented it from fully evolving in time to overcome the massive challenges of fighting a crushing multiple front war against materially superior Allied forces.

Generally, there were two types of intelligence staff work in the Wehrmacht during the war. The first was command support intelligence. This was the 1c and his staff building the tactical intelligence picture for a division, corps, army or army group. The second was theater-level intelligence support that provided the overall intelligence picture, sometimes with forecasts and baseline products for theater-wide use.<sup>61</sup> The most important sources of information came from radio intercepts, air reconnaissance, interrogations of captured personnel and reporting from combat units.<sup>62</sup> Throughout the war, the Wehrmacht made efforts to improve intelligence, but by the war's end, the branch was still very much a suppressed function under operations and never advanced beyond a very embryonic capability.

In the German Army the division was the basic operational formation that could fight and sustain itself on its own and it was here the Wehrmacht organized the elements of its combined arms capability—artillery, mortars and mobile forces connected to air

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<sup>61</sup> Khan, *Hitler's Spies*, 427.

<sup>62</sup> Ibid., 210.

support by radio—to achieve decisive effect.<sup>63</sup> The division was also the lowest level that the German army assigned general staff officers, and so the division was the lowest level that a 1c staff officer served.<sup>64</sup> 1c intelligence support was primitive below division level. Commanders at regiment and below used their adjutants or supply officers as part-time intelligence officers supported sometimes by a linguist non-commissioned officer (NCO), assigned from a higher 1c staff, to run the unit's tactical interrogations.<sup>65</sup> The focus of work was to pass immediate combat intelligence up to the army group where intelligence expertise could make use of it.<sup>66</sup>

The work of a general staff 1c at a division, corps, army or army group consisted of collecting reports from photo reconnaissance and radio intercepts, informant reporting, interrogation reports and front line combat reports to develop the 1a's enemy situation picture.<sup>67</sup> The terrain and enemy order of battle information at the start of an invasion was typically the work of aerial photo-reconnaissance, visual observation from the ground, radio intercepts, open source newspapers and a small amount from the Abwehr spy network. This information, collected and presented for use by the commander and 1a and stored for later trend analysis, rarely rose above reporting enemy formations and their locations.<sup>68</sup> The 1a provided the overview enemy picture to the commander.<sup>69</sup> At each higher level, the staff grew in size to meet the wartime demands for intelligence. At its

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<sup>63</sup> Khan, *Hitler's Spies*, 403.

<sup>64</sup> Ibid., 403.

<sup>65</sup> Ibid., 402.

<sup>66</sup> Ibid.

<sup>67</sup> Ibid., 400.

<sup>68</sup> Ibid., 423.

<sup>69</sup> Ibid., 400-401.

peak, the army group 1c staff consisted of 31 personnel, 13 officers, and 18 NCOs still inadequate and subordinate to operations.<sup>70</sup>

Moreover, there was no organization at the top of Germany's armed forces providing direction to subordinate agencies or building a full picture from intelligence reporting. At this point in the war, intelligence coordination should have been a key goal as the Wehrmacht adapted to a changing battlefield and looked to increase its military effectiveness in the face of an increasingly more dangerous military situation. Yet the German army continued its practice of diminishing intelligence at a time when it needed it the most.

### **Theater and Strategic Intelligence**

In the early years of the war, the size of the OKH's intelligence staff increased and split into two: Foreign Armies West to oversee Western Europe and Foreign Armies East to cover the Soviet Union.<sup>71</sup> Foreign Armies West and East emerged to become the most important intelligence agencies of the Third Reich. With no senior coordinating office to oversee all government intelligence collection and processing, the West and East branches filled this role. Within these two offices, analysts assembled the most comprehensive picture of the enemies facing Germany throughout the war.<sup>72</sup>

The intelligence work of Foreign Armies West and East branches consisted of a wide range of intelligence tasks from directing intelligence collection, building data repositories on enemy order of battle, terrain analysis, training soon to deploy 1c's, and summarizing reporting from multiple reporting agencies into a single narrative and

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<sup>70</sup> Khan, *Hitler's Spies*, 403.

<sup>71</sup> Ibid., 420.

<sup>72</sup> Ibid., 418-442.

sometimes offering judgments and prediction.<sup>73</sup> Both these organizations operated continuously for over six years.

Over time, Foreign Armies, acting as the central brains and loose coordinators of all German military intelligence collection capability, grew in size, experience, and stature. They developed methods for estimating probable attacks of enemy forces that were sophisticated and many times accurate, especially at the tactical level.<sup>74</sup> Foreign Armies East became competent at analyzing Soviet operations and its work became legendary. After the war, the United States and later the West German Government organized members of the group, called the Gehlen Organization after General Reinhard Gehlen, the four-year director of Foreign Armies East, into a stand-alone spy agency to conduct intelligence operations against the Soviet Union across Eastern Europe.<sup>75</sup> The success of the intelligence branch rested on their ability to pull together the Wehrmacht's loosely coordinated collection capabilities from aerial photography, radio intercepts, interrogations, and combat unit and Abwehr reporting into a tighter system so that it could be analyzed in a single synthesis.<sup>76</sup> Foreign Armies East circulated products from this analysis through out the Wehrmacht and lcs used the *Red Bible* (that listed the Soviet order of battle) to help keep track of Soviet formations facing them.<sup>77</sup> There were even how-to publications on tactical intelligence and an updated series on Soviet tactics and weapons.<sup>78</sup> Representing its new stature and importance in the German army, the OKH

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<sup>73</sup> Khan, *Hitler's Spies*, 412.

<sup>74</sup> Ibid., 429-433.

<sup>75</sup> John Prados, *The Secret Wars of the CIA* (Chicago, IL: Ivan R Dee, 2006), 55-57.

<sup>76</sup> Khan, *Hitler's Spies*, 430.

<sup>77</sup> Ibid., 435.

<sup>78</sup> Ibid.

assigned hundreds of personnel to the organization and, especially important, increased the rank of combat lc's to the same level as the 1a so they could be more effective. Increased information and better methods to process it permitted the branch to improve counting and locating as well as assembling judgments on probable enemy actions.

Despite the technical enhancements, organizational changes and improved perceptions of the craft, German military intelligence missed predicting almost every major Allied attack of the war. It missed Operation TORCH,<sup>79</sup> the Allied invasion of North Africa, even though Mussolini and most of the Italian leadership believed Allied operations were eminent and told the Wehrmacht so.<sup>80</sup> Foreign Armies West, misled by fake papers placed on a floating dead British officer by British MI6 to deceive German Intelligence, believed the ruse and missed the assault on Sicily (the Operation MINCEMEAT deception).<sup>81</sup> They also missed predicting Operation SHINGLE, the Allied amphibious landing at Anzio and Nettuno in January 1944.<sup>82</sup> Hitler and the senior leadership were well aware of these failures. Hitler even remarked, "the few landings that they have made, we didn't spot at all."<sup>83</sup> In the Eastern theater, the predictions were just as bad. Foreign Armies East missed the Soviet 1943 winter offensive that trapped Field Marshal Friedrich Paulus's 6th Army in Stalingrad believing instead that Army Group Centre would bear the weight of any offensive.<sup>84</sup> Failure to foresee nearly every

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<sup>79</sup> Khan, *Hitler's Spies*, 424.

<sup>80</sup> Citino, *The Wehrmacht Retreats*, 43.

<sup>81</sup> Khan, *Hitler's Spies*, 424.

<sup>82</sup> Ibid.

<sup>83</sup> Ibid., 425.

<sup>84</sup> Ibid., 440.



major Soviet operation would continue for the next two years in Russia and each time the Germans, fighting a losing defensive battle, would give back more territory.<sup>85</sup>

German military intelligence's biggest failure was missing the date and place of the expected Allied cross-Channel invasion in 1944. Foreign Armies West's overestimation of the number of Allied divisions in England may have contributed to Hitler and the OKW believing the Allies had enough forces for two landings—a notion that never went away—thanks to the successful Allied deception (Operation FORTITUDE).<sup>86</sup> In the end, Foreign Armies West completely missed the 6 June invasion date and location, and, like the rest of the German army leadership, failed to recognize Normandy as the main effort until late July 1944.<sup>87</sup>

## Summary

The Wehrmacht of WWII emerged out of the defeat of WWI to become one of the most successful operational fighting forces in history. Using the airplane, radio and mechanized vehicle in a combined arms system of breakthrough and encirclement, the Germans overcame the static, positional warfare of WWI, restored offensive operational maneuver, and reestablished the operational art to achieve, rapid decisive victory.

The Germans understood armor, mechanized equipment, airplanes and the radio as a piece of a larger system that enhanced their traditional way of war—a combined arms system dating back to Moltke of combining artillery, infantry and aggressive maneuver to surround an enemy and annihilate it in a pocket of fire or *kessel*. There was not an army that fought Germany in the 1939-1942 timeframe that did not lose its first

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<sup>85</sup> Khan, *Hitler's Spies*, 440.

<sup>86</sup> Ibid., 496.

<sup>87</sup> Ibid., 519.

battles to the Wehrmacht, which unleashed devastating power that at the time could not be physically or psychologically countered.

This form of warfare prevailed until Germany attacked the Soviet Union. With neither the resources nor the capability to overcome the vast expanse of a theater stretching across a continent, the German way of war became ineffective. The Soviets adapted by layering defenses in depth and employing their own adaptations of combined arms maneuver to annihilate German forces now fighting positional defensive battles. In the West, the Germans were unable to maneuver, forced into battles of attrition they could not win, and overwhelmed by the material superiority of the United States. Not designed to handle the attrition of protracted campaigns, the Wehrmacht became overextended and exhausted as its enemies now employed their way of war against them.

The German way of war was also fatally crippled by three institutional factors: the disdain by the officer corps toward intelligence, the exaggerated role of the commander in decision-making, and the cult of the decisive operation. Arguably, poor intelligence was a critical factor in contributing to defeat. Primitive at best and subordinate to the operations staff, intelligence functions improved as the war progressed. As Germany's method of war changed from offense to defense, the intelligence changed as well, but not enough to overcome the other institutional conditions that defined the German way of war.

For all its advancement in remaking combined arms, the German balancing and harmonizing of physical military functions did not extend to nonphysical capabilities such as intelligence. The Germans applied great energy in balancing military capabilities and avoiding the lure that overtook the Allies of overweighting certain capabilities over

others, such as the primacy of airpower and tanks over infantry or each other, but in the end, their synthesis of an operational combined arms team had little place for intelligence. Like all Western armies before the war, German military intelligence capabilities were immature. Unlike other militaries though, German military leaders understood the role of intelligence far better than the Allies but consumed by what they could achieve with combined arms operations, they missed this critical area for balancing. While German commanders saw the advantages a vibrant intelligence function provided their forces, they were unwilling to pay the price for the capability. In the German view, intelligence was not a precondition for victory. Offensive operations did not require detailed intelligence; aggressive action could make clear any situation and the will of the commander could pierce the fog of war. German leaders only wanted a small office to summarize the immense flow of information and deliver it to the commander so *he* could assemble it into a coherent picture based on *his* understanding. They were afraid that the intelligence office would become more important than the commander. They were afraid that a specialist function would replace their intuitive style of fighting. They wanted just enough intelligence to point them in the general direction of the fight, but they did not want too many details. They did not want larger staffs, wires, tents, and equipment that would weigh the force down and gum up operations.<sup>88</sup> They felt that their qualitative superiority in moral will, élan, aggressiveness, training, doctrine, and operating methods would prevail—they could not lose. The Germans fought mostly blind, and, in most cases, purposely so. Their mode of warfare carried

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<sup>88</sup> Khan, *Hitler's Spies*, 533.

them to extreme heights of operational success and they believed in it to the point where little else mattered.

Unconvinced of its utility and determined to prevent it from altering the German way of war, the Germans subordinated the intelligence branch to operations so thoroughly that it could barely communicate and, when it did, it had to pass through multiple time delaying and distortive channels. Officers who served in the intelligence branch were mostly less qualified than their operations counterparts, and outranked and outflanked by the operations staff, especially in making judgments that might contradict the commander. Their value increased in the later years of the war, when any advantage was welcome that could help pit limited German strength more effectively against the enemy. But as useful as these changes were, they could not return decisive operational victory to the Wehrmacht.

The effectiveness of the 1939-1942 Wehrmacht imprinted on military leaders of post-WWII Western armies for decades and continues today. North Atlantic Treaty Organization (NATO) and Warsaw Pact forces adopted the Wehrmacht's model along with its institutional weaknesses—especially towards operational intelligence. The post-Cold War world has revealed the limitations of this model just as was done by Operation BARBAROSSA in 1942 and the Normandy campaign in 1944. The Wehrmacht did not adapt sufficiently—it is now time for the U.S. joint force to learn from these lessons.

## **CHAPTER 3: DEDUCTIVE-DOCTRINE, INDUCTION AND ARCHITECTING A BETTER COMPLEX ADAPTIVE SYSTEM**

### **Introduction**

This chapter establishes the inadequacy of deductive-reductionist methods that today account for the majority of U.S. doctrine—especially at the operational level of war. This chapter continues the argument that current military thinking and joint doctrine that guides joint operational thinking is too anchored in the past, specifically the 1939-1942 German experience on the Eastern and Western fronts. This outmoded approach, with its bias against intelligence must change. Applying insights from complexity science and chaos theory, the merits of an inductive-holistic approach to operational planning and execution are compared against today’s deductive-reductionist methods. This chapter, together with Chapter 2 on the German military bias against intelligence, establishes the foundation for a new combined arms system that properly balances physical and nonphysical capabilities in a continuous receive-respond, collect-pulse connection between intelligence and operations.

### **Today’s Doctrinal Mindset for Understanding Reality—Deduction-Reduction**

Military doctrine is formalized thinking about war.<sup>1</sup> Drawn from experience, observation, and history, military doctrine contains a wide set of specific conclusions or general principles related to the conditions and practices of warfare. Reducing war to basic principles within a doctrinal context is possible because, according to Colin Gray, “there is unity to all strategic experience in all periods of history because nothing vital to

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<sup>1</sup> Harald Hoiback, “Understanding Military Doctrine; A Multidisciplinary Approach” (New York: Routledge, 2013), 181.

the nature and function of war and strategy changes.”<sup>2</sup> J.F.C. Fuller summarized his view of the utility and use of deductive science to formulate doctrine in his book *Foundations of the Science of War*:

We first observe, next we build up a hypothesis on the facts of our observation; then we deduce the consequences of our hypothesis and test these consequences by an analysis of phenomena; lastly we verify our results and if no exception can be found to them we call them a law.<sup>3</sup>

Doctrine draws much of its authority from the enduring and unchallengeable nature of its universal principles and reinforces its weight by advising caution and even professional sanction for not adhering to its precepts.<sup>4</sup>

The deductive process continues to be a key feature of the U.S. military doctrinal process today.<sup>5</sup> Doctrinal principles and practices of war emerge deductively from a study of the characteristics or patterns of conflict. Codifying deduced laws or first principles from military theorists into doctrine after review and scrutiny is a core task of the military service and joint staff doctrine organizations.<sup>6</sup> New concepts emerge as doctrine when military forces incorporate new technologies or adapt to changing conditions on the battlefield.<sup>7</sup> The goal of this process is to provide a military professional facing a set of challenging conditions, steps for understanding and solving them. Reducing experience, observation and history to the deduction of immutable laws

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<sup>2</sup> Colin S. Gray, *Modern Strategy* (Oxford: Oxford Press, 1999), 1.

<sup>3</sup> J.F.C. Fuller, *The Foundations of the Science of War* (London: Hutchinson, 1926), 46.

<sup>4</sup> Colin McInnes, “The British Army's New Way in Warfare: A Doctrinal Misstep?” *Defense & Security Analysis* 23:2 (2007): 127-141.

<sup>5</sup> James R. Blaker, *Transforming Military Force: The Legacy of Arthur Cebrowski* (Westport, CT: Praeger Publishers, 2007), 221.

<sup>6</sup> John L. Romjue, *American Army Doctrine for the Post-Cold War* (Fort Monroe, Virginia: Military History Office, United States Training and Doctrine Command, 1996), 9-10.

<sup>7</sup> Bert Chapman, *Military Doctrine* (Westport, CT: Praeger Publishers, 2009), 42-74.

or fundamental principles give the military profession a common framework for understanding core principles of warfare.<sup>8</sup> When put into operation, doctrine often follows an if-then construct—if the conditions in the environment resemble what doctrine outlines, then the professional is advised to use the provided solution. War, like any other ancient practice, has undeniable precepts, rules, propositions, and patterns that, if followed properly, increase the likelihood of success.

Applying deductive formulas can provide a boost when first starting on a problem and trying to determine an effective course of action. For example, deductively applying universally well-known principles of war to planning and execution such as objective, mass, surprise, and simplicity gives the military practitioner a means to apply concepts that have been part of successful campaigns in the past.

A problem with deductive military formulas and doctrinally driven solutions is that they become substitutes for thinking and understanding.<sup>9</sup> Reliance on doctrine alone can create template thinking: when a military professional indiscriminately applies deductive doctrinal formulas to every situation, despite contradictory evidence or changed conditions.<sup>10</sup>

Doctrine often fails when incorporating new concepts, technologies or responding to new conditions.<sup>11</sup> Because it is deductive, it relies on Fuller’s scientific process of using first principles or laws to solve military challenges. Doctrine developed to meet new conditions, concepts, or technologies is often based on deduced laws or principles

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<sup>8</sup> Neville Parton, “In Defence of Doctrine, but not Dogma” *Defense & Security Analysis* 24:1 (2008): 81-89.

<sup>9</sup> McInnes, “The British Army's New Way in Warfare,” 127-141.

<sup>10</sup> *Ibid.*, 127-140.

<sup>11</sup> Robert M. Citino, *From Blitzkrieg to Desert Storm: The Evolution of Operational Warfare* (Lawrence, KS: University of Kansas Press, 2004), 102.

from the past—they are not fully matched to new conditions on the battlefield. In the opening years of WWII, the U.S. Army’s doctrine misunderstood the importance of the tank and instead relied on a concept of the tank destroyer, a deduced concept and material solution based on pre-WWII army doctrine, that was a disaster when U.S. forces met up with the German offensive war of maneuver.<sup>12</sup> The failure to embrace tank warfare and develop tanks on par with Germany and Britain has been classified as “one of the great doctrinal wrong turns of the century.”<sup>13</sup> The inadequacy of existing doctrine is revealed when repeated cases of failure forced change. When the United States entered the war and the tank destroyers encountered German tanks, neither the equipment nor doctrine fared well. General George S. Patton, the commander of II Corps in North Africa in 1942, “pronounced the tank destroyers unsuccessful in the conditions of the theater.”<sup>14</sup> General Jacob L. Devers, the U.S. 6th Army Group Commander in Europe, stated in a report to the War Department, “The separate tank destroyer arm is not a practical concept on the battlefield.”<sup>15</sup> Patton, Devers, and others argued that the best way to defeat another tank was with a better tank, but, despite the criticism and operational ineffectiveness, Army leadership maintained the tank destroyer concept throughout the war.<sup>16</sup> Today, there are small camps with compelling criticism who cite the U.S.

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<sup>12</sup> Citino, *From Blitzkrieg to Desert Storm*, 102.

<sup>13</sup> Ibid., 100-102.

<sup>14</sup> Bryan E. Denny, *The Evolution and Demise of U.S. Tank Destroyer Doctrine in the Second World War* (Fort Leavenworth, KS: Army Command and General Staff College, 1985), 24.

<sup>15</sup> Denny, *The Evolution and Demise*, 24.

<sup>16</sup> Christopher R. Gabel, *Seek, Strike, and Destroy: U.S. Army Tank Destroyer Doctrine in World War II* (Fort Leavenworth, KS: Army Command and General Staff College, 1985), 65-69.



military's counterinsurgency (COIN) doctrine found in Field Manual (FM) 3-24 as another example of incorrect doctrine.<sup>17</sup>

Other times deductive-doctrine works at first, but then an adversary adapts and renders it less useful or even obsolete when a force adopts successful operational counters after the initial surprise wears off.<sup>18</sup> Success in war many times breeds overconfidence, often blinding the leaders from recognizing how the enemy is adapting. The strength of their faith in doctrine can restrain critical thinking and prevent other approaches that would be more effective.<sup>19</sup> Doctrinally fixated leaders can and often force solutions onto the situations they encounter regardless of the facts to the contrary.<sup>20</sup>

German commanders suffered this fate of doctrinal blindness in the summer of 1943 when the Red Army adapted to the Wehrmacht's war of maneuver and combined arms. By defending in depth with mass formations, the Soviets reversed the success of German offensive doctrine by preventing penetration and encirclement from flanking tank columns.<sup>21</sup> Up to this point, the Wehrmacht had defeated every army it faced in the first battles because German maneuver and combined arms destroyed the enemy's cohesion by collapsing the forward, linear defensive formations and then encircling and annihilating the rest of the enemy's forces.<sup>22</sup> The German assaults were so overwhelming in speed and depth that few armies survived intact to resist.<sup>23</sup> On the Eastern Front, those formations that did survive and returned to fight gradually learned to absorb the shock of

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<sup>17</sup> Gian Gentile, *America's Deadly Embrace of Counterinsurgency* (New York: New Press, 2013).

<sup>18</sup> McInnes, "The British Army's New Way in Warfare," 127-141.

<sup>19</sup> Ibid., 127-141.

<sup>20</sup> Ibid.

<sup>21</sup> Robert M. Citino, *Death of the Wehrmacht*, 289.

<sup>22</sup> Ibid., 18.

<sup>23</sup> Ibid.

German offensive maneuver and turned the relentless German assault to their advantage by inviting the German maneuver to wear itself down before launching a powerful counterattack.<sup>24</sup> The Soviet's took advantage of their numerical strength to copy the German template, but added massive artillery strikes to complement armored maneuver.<sup>25</sup> The Germans by 1943 were at the limits of their resources and, forced to defend vast expanses of the Soviet Union, were vulnerable to the Soviet counter blitzkrieg.<sup>26</sup> Their offensives were still powerful, but doctrinally unsound, relying on a formula that no longer reflected the realities of the battlefield.<sup>27</sup> The Wehrmacht continued to pour their combat power in aggressive combined arms assaults hoping to break and shatter Soviet resolve only to discover that the Soviet in-depth, elastic defense with a prepared mass formation counterattack force could absorb their assaults.<sup>28</sup> The Germans lost the initiative and still continued to rely on their offensive-oriented doctrinal precepts unable to recognize an alternative to the Soviet adaptation.<sup>29</sup>

The American combat experience following the 1991 Gulf War reflects the same limits in thinking and rigid adherence to doctrine that German leadership displayed in WWII. The overwhelming and near effortless victory against the anemic Iraqi army in the first Gulf War validated the two decade long development of AirLand battle doctrine—the cornerstone of high intensity combined arms warfare intended to culminate

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<sup>24</sup> Citino, *Death of the Wehrmacht*, 96-97.

<sup>25</sup> Ibid., 172.

<sup>26</sup> Ibid., 181-182.

<sup>27</sup> Ibid., 174-178.

<sup>28</sup> Ibid., 252.

<sup>29</sup> Ibid., 252-253.

the Warsaw Pact invasion of Europe.<sup>30</sup> The principles of a fast-paced, offensive-oriented joint force employing fires and maneuver was reflected in every aspect of U.S. warfighting doctrine from 1991 to 2001.<sup>31</sup> Despite indications that the post-Cold War world had reshaped warfare, the U.S. military leadership maintained the faith that the most likely war the United States would fight would be a replay of the 1991 Gulf War. By the time of the 9/11 attacks, doctrinal precepts so carefully and confidently maintained over the past decade were inadequate for other modes of warfare conducted by different types of adversaries and waged under other conditions. Trained for two decades on advanced offensive doctrine, U.S. military formations brought a conventional, maneuverist doctrinal mindset to Afghanistan and Iraq.<sup>32</sup> Like the German commanders sixty years before, doctrinally focused commanders pressed AirLand battle/maneuver warfare offensive procedures onto a battlefield and against an enemy that required different solutions than what the highly refined U.S. combined arms warfighting formations brought to Iraq and Afghanistan. It was not until 2004 that the Army and Marine Corps began to adapt to new realities, but they could not break away from heavy firepower solutions even as maneuver formations were broken down into small groups controlling the terrain they occupied.<sup>33</sup>

Both the example of the German army in 1943 and the U.S. joint force in the Global War on Terror illustrate the complications that arise when doctrinally driven forces are immersed in a military culture that emphasizes deductive, prescriptive methods

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<sup>30</sup> James Kitfield, *Prodigal Soldiers* (Washington: Potomac Books Inc., 1997), 325, 331.

<sup>31</sup> *Ibid.*, 367, 373.

<sup>32</sup> Thomas E. Ricks, *Fiasco: the American Military Adventure in Iraq, 2003 to 2005* (New York: Penguin Books, 2007), 232 and 312.

<sup>33</sup> *Ibid.*, 414-416.

of warfare. Doctrine presented descriptively and prescriptively creates a mindset that is difficult to break free from when conditions change. Leaders trained in prescriptive approaches become focused on applying doctrine instead of investing in critical and innovative thinking.<sup>34</sup> All military professionals see the world through a doctrinal lens whether they are aware of it or not. The risk is that while war has some immutable principles, warfare continues to change, often faster than doctrinal precepts can be established to reflect the new conditions. When new conditions are encountered that are different than what doctrine outlines, leaders must avoid a closed view of the world shaped by deductive approaches to doctrine.

Today's joint U.S. military doctrine weighs fire and maneuver over other functions and emphasizes defined end states and objectives with clear timelines.<sup>35</sup> These precepts of warfare were crafted in an age when nations measured power by military capability to wage total war. Today, military force serves multiple purposes, many not even related to national survival, addressing international problems that are not fully understood nor have clear intended outcomes.<sup>36</sup> The military instrument will many times be a secondary, supporting enabler to the political, economic, or informational elements of national power. Military professionals, prepared by doctrinally correct modes of thinking, seek clearly defined end-states and objectives that allow conventional forces to apply overwhelming fires and offensive maneuver against a conventional enemy's center of gravity because that is the doctrinal prescription for success. When doctrinal warfighting precepts clash with policy, decision-makers find themselves constrained,

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<sup>34</sup> McInnes, "The British Army's New Way in Warfare," 127-141.

<sup>35</sup> U.S. Joint Staff, *Joint Operations* Joint Publication 3-0 (Washington, DC: Joint Chiefs of Staff, August 11, 2011), V1-V65.

<sup>36</sup> McInnes, "The British Army's New Way in Warfare," 127-141.

forced to choose between a doctrinal war or nothing. Doctrine usually offers only big military solutions that do not fit well into modern political-strategic contexts.

Doctrine influences military operations to be of a certain kind—offensive, overwhelming, well defined and executed with only limited political constraints and interference. Despite the protests of military leaders, over the last two decades military force has been used increasingly without doctrinally prescribed, well-defined end states or clearly formulated objectives from civilian leaders, leaving the military to just do something.<sup>37</sup> Military analysts and professionals criticized operations such as Somalia, Kosovo, Haiti and now Iraq and Afghanistan because political leaders did not correctly employ fundamental doctrinal elements of military power, such as overwhelming force, firepower, well-defined objectives and freedom to attack enemy centers of gravity resulting, in their view, in ineffective military operations and thwarted success.<sup>38</sup>

Shaping policy by relying on doctrine to determine how the military instrument should or should not be used may be a dangerous path, especially when doctrine is too narrow, misapplied, or worse, wrong. There is no that doubt military professionals need to be guided by a doctrinal base that consists of enduring principles to develop their professional knowledge of war, but doctrine has its limits—it cannot become prescriptive and a substitute for thinking. If this happens, it can produce a mechanistic military response, ignoring the enemy's adaptations or missing changes that may have rendered doctrine ineffective or obsolete. Instead of emphasizing deductive-doctrinal formulas to conduct operations, military professionals must accept that often they will need to put doctrine aside and think creatively or recast doctrine and adapt it to meet the new

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<sup>37</sup> McInnes, "The British Army's New Way in Warfare," 127-141.

<sup>38</sup> Ibid.

conditions they face. While deductive-doctrinal procedures offer less complex approaches for addressing battlefield situations, more emphasis on observing, understanding, and then formulating responses tailored to reality is of vital importance today. The problem is that without proper observation equipment, processes, and intellectual skills in place, enemy adaptation may go undetected, and the enemy can out-turn or gain the initiative by rapidly changing in unexpected and more effective ways.

### **An Alternate Method for Understanding Reality: From Deductive-Prescriptive to Inductive-Holistic**

When the military professional begins to solve a problem by applying a prescribed solution, the practitioner uses a deductive approach. The emphasis of a deductive-prescriptive approach is the effective and efficient application of a formula or process to gain an expected result. For example, deductive doctrinal methods for warfare in use today include applying any one of the reductionist military models to analyze the operating environment such Diplomacy, Information, Military and Economic (DIME); Political, Military, Economic, Social, Infrastructure, and Information (PMESII); and, Areas, Structures, Capabilities, Organizations, People and Events (ASCOPE). These models provide a simple formula to focus efforts quickly to produce facts for assessment. By reducing the complex elements of system to a few key facts, a staff can simplify a problem to construct options for a desired solution. Deduction ends after the formula is applied. If the formula is not working another deductive formula replaces it. The assumption with deductive-prescriptive methods is that if a formula is not working, the user is not using it properly or is applying the wrong formula. Instead, if theories, approaches, or prescribed doctrinal solutions are absent at the start and instead there is a

heavy emphasis on observation and inference to first establish situational awareness before action, then this is using an inductive approach.

Induction relies on observing, and then drawing an inference or tentative conclusion based on a repeated instance of some observed pattern. *Likely* and *probable* are key qualifiers for an inductive conclusion because even after observing a number of repeated instances or interactions, the inference may not be true. This is a key part of induction: while the observations are objective, the conclusions are subjective and characterized as low/weak or high/strong. In other words, there may be observations that contradict a previously held view, and as a result, the observer will modify the conclusion. Induction is less concerned with rock solid conclusiveness of a conclusion than its relative strength or soundness. Observations, related to war—the most reflective of human activities—are never completely certain. No one can observe the full set of potential human interactions or every possible pattern. Evidence is never conclusive: it is only partial and change occurs in unforeseeable ways. Understanding reality in an unstable environment many times requires the inductive skills of continuous observation and modifying inferences. Induction is continuous, new observations constantly influence conclusions that shape an understanding of reality, giving clues on how to define solutions.

In military operations, there is a place for both deductive and inductive modes for reasoning, understanding, and taking action. When facing a situation where the force needs tight control and repeatable proven processes against a known problem, a deductive-prescriptive is appropriate. Alternatively, induction is more appropriate in an unknown and unfamiliar situation that rapidly changes.

Operationalizing induction in a military context is difficult because it requires equipment, processes, and intellectual skills not commonly held by military professionals. In a military culture where there is a bias towards action and a primacy of operations, inductively learning about the dynamics of the environment and enemy is at best a secondary, assumed task, occurring in some indistinct way as part of a larger staff evaluation and assessment process. Insights from complexity and chaos theory have the potential to invigorate military operations with respect to operationalizing induction, redefining the role of the commander as well as rebalancing the functions of operations and intelligence. Complexity science offers insights for seeing, knowing, and adapting and chaos theory provides important lessons for influencing complex adaptive systems that can be applied to military plans and operations.

### **Complexity and Chaos—Towards a More Refined View of How to Operationalize Induction**

Invoking complexity and chaos concepts in military literature began in the early 1990s and continues today unabated.<sup>39</sup> Defining and explaining complexity and chaos is challenging because useful terminology has yet to emerge that rigorously defines the core concepts.<sup>40</sup> Military thinkers discovered from the large base of scientific literature that complex organizations have certain fundamental traits, and those traits provide a powerful way to understand adversary systems and their behavior. One of the insights offered is the difference between understanding linearity and nonlinearity. Linear systems are understood as being equal to the sum of its parts. But for nonlinear

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<sup>39</sup> Glen E. James, *Chaos Theory: The Essentials for Military Applications* (Newport, R.I.: Naval War College, Center for Naval Warfare Studies, 1996), 109.

<sup>40</sup> Melanie Mitchell, *Complexity: A Guided Tour* (New York, NY: Oxford University Press, 2009), 298.



phenomena, understanding at the individual sub-element level does not give a complete answer because the whole is different than the sum of the parts. Military professionals must examine complex environments to understand the underlying processes and identify key forces, factors, and drivers that will deliver an advantage over an adversary.

Thinking in nonlinear terms can provide an important conceptual framework to develop friendly complex systems that can understand and operate effectively against a hostile complex one. While there is not a comprehensive theory or agreed upon definition for complexity and chaos, it is possible to document a set of common properties of each and offer a working definition suitable for military professionals.

### **Complexity and Chaos: Basic Concepts**

- Complex adaptive or (non-linear) systems often exhibit sophisticated collective behavior that emerges from a large number of mutually interacting sub-elements that sense, store, process and react to information.<sup>41</sup>
- Complex systems often obtain information in a decentralized, autonomous way, with each of its many sub-elements processing this information separately without central direction.<sup>42</sup>
- Complex systems take key signals from the environment, and then change as necessary by learning and adapting.<sup>43</sup>
- Thus, the total output of complex systems is different from the sum of its parts.<sup>44</sup>

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<sup>41</sup> Mitchell, *Complexity: A Guided Tour*, 12-13.

<sup>42</sup> Ibid., 40-42.

<sup>43</sup> Ibid., 13.

<sup>44</sup> Ibid., 12-13.

- The result is dynamic behavior that comes from many small, mutually interacting sub-elements of a system that sense and process information, and adapt to new conditions.<sup>45</sup>

- When complex systems adapt they can produce massive, systemic change. The range of potential outcomes resulting from this change is many times scale-free, meaning events of all magnitudes can occur.<sup>46</sup>

Chaos is the generation of seemingly random actions that can emerge from any system from the repetition of a simple rule.<sup>47</sup> A change in the initial condition of a system can make long-term behavior hard to predict and interventions especially uncertain.<sup>48</sup>

Complex systems are not necessarily chaotic nor do chaotic systems necessarily have to be complex.<sup>49</sup> Complex systems generally are coherent in ways that chaotic systems are not; in fact, researchers describe complexity as a critical mid-point between order and chaos.<sup>50</sup> Certainly since the philosophical scientific concepts of the nineteenth century, war has been understood as embodying complexity and chaos. However,

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<sup>45</sup> Mitchell, *Complexity: A Guided Tour*, 13.

<sup>46</sup> Recent empirical studies show that war and conflict follow a scale free pattern. In fact, as scientists study complex systems they are discovering the presence of scale free or power law distributions in a variety of social and natural phenomena leading scientists to call them “more normal than normal. See M. E. J. Newman Doyle, J. C., and Li, L. More “‘Normal’ than Normal: Scaling Distributions and Complex Systems,” *Proceedings of the 2004 Winter Simulation Conference* Piscataway, NJ: IEEE Press (2004): 130–141.

<sup>47</sup> Mitchell, *Complexity: A Guided Tour*, 38.

<sup>48</sup> Steven M. Manson, “Simplifying Complexity: A Review of Complexity Theory,” *Geoforum* Vol 32 (2001): 405–414.

<sup>49</sup> Dean Rickles, Penelope Hawe, Alan Shiell, “A Simple Guide to Chaos and Complexity” *J Epidemiol Community Health*. Vol 13 (2007): 933–937.

<sup>50</sup> *Ibid.*, 933–937.

complexity and chaos research is providing a means to understand these concepts through a systems perspective.

### **The U.S. Military and Complexity and Chaos**

The U.S. Marine Corps (USMC) was one of the first military services to bring complexity and chaos theories to its doctrine. The 1997 version of Marine Corps Doctrinal Publication (MCDP 1-0), *Warfighting*, the Marine Corps capstone warfighting publication, emphasized that war is a complex phenomenon using the language from complexity science.<sup>51</sup> In 1998, the USMC published MCDP-6, *Command and Control*, writing four full pages to explain complexity in war using key concepts from complexity and chaos theories, presenting decision-making as continuous, interactive, and reciprocal.<sup>52</sup> It described a system to facilitate rapid learning and effective response.<sup>53</sup> Among the most important contributions of MCDP-6, were the insights on adaptation, specifically how command and control (C2) “provides the means to adapt to changing conditions.”<sup>54</sup> It emphasized, “[an effective C2 system] is always seeking information, learning and adapting in its quest for survival and success. Never in a state of stable equilibrium but instead in a constant state of flux—continuously adjusting to its surroundings.”<sup>55</sup> MCDP-6 articulated the requirement for an integrated C2 system that

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<sup>51</sup> Headquarters, United States Marine Corps, *Marine Corps Operations* MCDP 1-0 (Washington, DC: MCCDC, 1997), 12.

<sup>52</sup> Headquarters, United States Marine Corps, *Command and Control* MCDP 6 (Washington, DC: MCCDC, 1996), 44-47.

<sup>53</sup> *Ibid.*, 46.

<sup>54</sup> *Ibid.*

<sup>55</sup> *Ibid.*

placed battlefield information into a visual system so the commander could apply judgment and intuition and make decisions in near-real time.<sup>56</sup>

While doctrine displayed an appreciation for new conditions that define warfare by using complexity theory to shape the thinking of military professionals, Operation IRAQI FREEDOM illustrated that joint operations remained largely unchanged even though technology and concepts for fire and maneuver continued to advance. Joint operating forces, fighting complex adaptive adversaries, were missing an operational mode that permitted “interacting with its surrounding—especially the enemy rather than a closed system focused on internal efficiency.”<sup>57</sup> Joint and service doctrine introduced design thinking after several years immersed in complex armed nation building in Iraq and Afghanistan.<sup>58</sup> Planners required more understanding before jumping in and formulating a plan after receiving a mission. They wanted a fuller understanding of the characteristics of the environment, adversary, political direction, and mission given by their higher headquarters. Introducing design thinking was one effort among many over the years, to find ways to improve understanding in complex environments but, like other planning improvements, it is missing a systemic way to actively and continuously observe the real environment and act on this knowledge dynamically.

### **Complexity, Chaos and Warfare: Using the Inductive Approach**

What modern warfare has revealed is that non-linear attributes of a complex adaptive system (adversary force) often give rise to seemingly random collective

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<sup>56</sup> HQ USMC, *Command and Control* MCDP 6, 46-47.

<sup>57</sup> *Ibid.*, 46.

<sup>58</sup> Aaron P. Jackson, *The Roots of Military Doctrine: Change and Continuity in Understanding the Practice of Warfare* (Fort Leavenworth, KS: Combat Studies Institute, 2013), 65-76.

behavior that generates unknowable outcomes.<sup>59</sup> In these conditions, small interventions can have a significant impact across a system and extreme events are more likely to happen, making it difficult to account for the way the system will adapt, creating potentially disadvantageous conditions that can be hard to perceive or influence.<sup>60</sup>

Deductive planning methods and even today's operational design methodologies seeking to improve understanding during planning using a dialectic process still only *account* for complexity, falling short of operationally *addressing* it. In an unknowing nod to what would be understood one hundred years later in complexity science research, General Helmuth von Moltke the Elder summarized the key weakness of planning and the certainty that comes with it: “only the layman perceives the campaign in terms of a fixed original conception, carried on in all details and rigidly followed until the end.”<sup>61</sup> Setting up the conflict or war with the right strategy and operational plan is a vital function. Actively observing, processing, and adapting in near-real time are equally important, maybe even more so.<sup>62</sup> Spotting key moments during execution and then responding are critical actions necessary for countering complex adaptive systems. Among the important insights from complexity thinking that can help expand how to use induction to make sense of complex environments are thinking in terms of nonlinearity, the need for active observation processes and improved intellectual skills to better react to the dynamism of twenty-first century operations.

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<sup>59</sup> Garnett P. Williams, *Chaos Theory Tamed* (Washington D.C.: Joseph Henry Press, 1997), 10-11.

<sup>60</sup> Robert Axelrod and Michael D. Cohen, *Harnessing Complexity: Organizational Implications of a Scientific Frontier* (New York: The Free Press, 1999), 63-116.

<sup>61</sup> Robert M. Citino, *Quest for Decisive Victory: From Stalemate to Blitzkrieg in Europe, 1899-1940* (Lawrence, KS: University Press of Kansas, 2002), 20.

<sup>62</sup> Arthur Battram, *Navigating Complexity: the Essential Guide to Complexity Theory in Business and Management* (London: Spiro Press, 2002), 212-213.

## Non-linear Thinking, Active Observation Processes and Intellectual Skills for Rapid Action

Complex phenomena such as weather, living matter, economic markets, and opposing sides in war consist of massive numbers of interacting sub-elements that take on properties none have alone and, even if it were possible to describe all the parts, their behavior is not explainable by reducing the parts to their basic elements.<sup>63</sup> Reductionist approaches help explain *linear* systems because the whole is equal to the sum of the parts. But for *nonlinear* phenomena, understanding at the individual sub-element level does not give a complete answer when the whole is different than the sum of the parts and pieces change and move.<sup>64</sup>

Similar to scientists, military professionals study complex environments and attempt to understand underlying system processes hoping to identify the factors and drivers that they can use or reduce that will deliver an advantage over an adversary. Understanding complex phenomena requires a different framework, one that is more than just working independently, breaking pieces down and solving for x, then rolling micro results up to the next higher level and solving for a system-wide solution. Thinking in terms of nonlinearity can provide an important framework to both better steer and organize a *friendly* complex system and understand and operate against an *opposing* one. Linear, reductionist approaches can miss the interrelated nature of complex problems, a necessary element to understand the important properties of non-linear systems. Focusing on the interactions allow an observer to see how activity arises from small-scale

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<sup>63</sup> Nassim Taleb, *The Black Swan: The Impact of the Highly Improbable* (New York: Random House, 2007), 178.

<sup>64</sup> Ludwig Von Bertalanffy, *General Systems Theory: Foundations, Development, Applications* (New York: George Braziller, Inc., 1968), 39-41.

processes. This suggests that professionals should look at the whole environment, not just pieces of it, and observe how each part influences the other. Holism is a whole to parts process, where the observer first observes the wider aspects before deconstructing a problem into parts and studying individual pieces.

The multiple links between sub-elements force an observer to consider all the elements simultaneously and the observer knows that even while adapting, everything changes—sometimes the act of observing alone starts to initiate change.<sup>65</sup> This complexity requires intensive information gathering, processing, and integrating processes, as well as intellectual skills, to cope with the dynamic adaptations.<sup>66</sup>

In Iraq in 2004, faced with a task that clearly had no connection to doctrine, General Stanley McChrystal, Commander of Joint Special Operations Command, believed that in order to successfully fight the al Qaeda terrorist network, he needed to make his own organization a network.<sup>67</sup>

Successful complex adaptive systems possess a highly developed observation-information processing capability.<sup>68</sup> This gives them an increased ability to understand, and, in some cases, influence other self-organizing systems with adaptive properties. Feedback is a systems theory and complex science term used to explain how internal and external stimuli come into an adaptive system and trigger information processing and response. A primary element is the ability of an observation and feedback process to not just observe but also actively explore an environment. Sophisticated observation contains

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<sup>65</sup> Dietrich Dorner, *The Logic of Failure: Recognizing and Avoiding Error in Complex Situations* (Reading, MA: Basic Books, 1997), 38.

<sup>66</sup> Ibid., 38.

<sup>67</sup> General Stanley McChrystal, *My Share of the Task: A Memoir* (New York: Portfolio Hardcover, 2013), 149-154.

<sup>68</sup> Mitchell, *Complexity: A Guided Tour*, 169-185.

a mix of both passive and active processes largely driven by the systems perceived needs.<sup>69</sup> Passive observation consists of perceiving changes in the environment or new phenomena by absorbing incoming stimuli, while active is exploratory, characterized by placing energy into a system by pulsing far afield of the system itself. There are different types of pulsing: unfocused, random exploration and focused, narrow probing in response to something identified previously by the system.<sup>70</sup> Closely connected to passive or active observation is the diagnostic capability to understand meaning and decide what to do after receiving information.<sup>71</sup> This is a collective action done by interconnected sub-elements each making decisions based on what others think and do around it.<sup>72</sup> Information is less about volumes of complex data located in a central place and more about spatial representations of dynamical patterns flowing through the system.<sup>73</sup> The autonomous sub-elements respond in their way to observations and to what others are doing around them, the entire system moves and adapts organically, almost feeling its way through the challenges it faces.

In a similar way, General McChrystal developed his organization into a streamlined network with decentralized processes, using experts from many different fields looking at the enemy network, supported by enormous information flows to allow various groups to connect and understand.<sup>74</sup> The group never came to a full system-wide knowledge of the enemy network, but it did assemble sufficient information for

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<sup>69</sup> Mitchell, *Complexity: A Guided Tour*, 182.

<sup>70</sup> Ibid., 183.

<sup>71</sup> Ibid., 40.

<sup>72</sup> Ibid., 179.

<sup>73</sup> Ibid., 180.

<sup>74</sup> McChrystal, *My Share of the Task*, 148-156.



explaining key parts of the system as they existed at a particular moment in time, reflecting an understanding that systems are constantly adapting. McChrystal and his organization were operating-to-know the complex adaptive environment of an enemy system with the understanding that while the full picture would never emerge, they could see more of it if they organized to observe—a key part of understanding a complex system. McChrystal created a strong internally robust and resilient structure employing a wide variety of sensing, feedback, and processing mechanisms.<sup>75</sup> His organization learned that just passively observing the environment and piecing a picture together was not sufficient to aid in understanding complex adaptive environments and challengers. The results of active observation and pulsing followed by observation were passed to a diagnostic system for interpretation and response. These attributes of McChrystal's system matched and for a time gained an advantage over al Qaeda's complex adaptive system.

Doctrinally sound deductive intellectual approaches are designed to avoid the wrong answers and seek to minimize risk, and, given the wide range of military users with varying intellectual capabilities, they are meant to be performed by personnel at all capability levels. Deductive intellectual approaches avoid *dark art-like* processes that are complicated and only a few understand—instead, they provide common institutional procedures with good enough solutions so the joint force can operate effectively in a wide range of environments and not lose. Unfortunately, by operating in a risk averse way where losing is unlikely, it is hard to decisively win. More emphasis on observing, understanding and then rapidly formulating tailored responses, converting knowledge

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<sup>75</sup> McChrystal, *My Share of the Task*, 156.

into action, to get ahead in fluid and dynamic conditions is vital today to better respond to adaptive asymmetric conditions that do not lend themselves to if-then doctrinal rationalizations.<sup>76</sup> A primary element of the intellectual approach is the integration of intelligence and operations, creating an immersive environment for both operations and intelligence so both can spot opportunities and rapidly exploit them. This arrangement defies the culture of the stove-piped, hierarchical staff structure where intelligence and operations are largely separated. Instead what emerges is a flat network between the two functions, with both sides immersed in the fine grain details of the environment, and when opportunities surface both have an intuitive sense that helps them react and seize critical opportunities rather than react in a linear way.

## Summary

There are different ways to understand reality. Reductionist cause-and-effect and if-then deductive approaches work well when there are few basic states or fixed variables and constraints limit alternatives. Linear phenomena are static, showing little volatility in their range of potential outcomes and are usually deterministic in that their future trajectory is generally predictable and their evolution is knowable. Deconstructing problems into parts, solving each part separately then putting the system back together to construct a full solution is a proven method of deductive scientific reasoning and the basis for the majority of U.S. military doctrine and analytic thinking. Deductive military doctrine takes knowledge from previous cases and packages it into universal formulas and theories that in the past successfully explained the underlying process that generated an observed pattern. Military professionals then apply the universal principles and

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<sup>76</sup> Taleb, *The Black Swan*, 292.

formulas from doctrine to situations that appear appropriate according to doctrinal explanations. In fast-paced scenarios, running a formula against a military problem can provide a significant advantage.

In contrast to the deductive-reductionist-prescriptive approach to understanding, an inductive-holistic approach addresses problems that are nonlinear, complex, and exhibit features of chaos, where small effects lead to wide uncertainty. In nonlinear cases, situations vary. Systems composed of large numbers of sub-elements move in different directions and are subject to unique system-wide outcomes where large or small interventions affect a single or multiple sub-elements. Aggregate patterns often reveal more about nonlinear systems than micro internal details. Multiple collections of sub-elements, working together, take on properties that none of the sub-elements have on their own, so individual sub-element analysis, while useful, often misses the key dynamics of the system.

Achieving understanding is a process of going back and forth between micro and macro levels—whole to parts. Induction is the process of observing a pattern, then inferring the underlying process to understand reality. By first seeing the environment holistically, in a broad pattern, the observer can watch for critical cues and then narrow down on key sub-elements as appropriate, aware that conclusions are temporary because the observed system is dynamic, shifting, and changing even in response to observation. Induction is based on a strong system of observation and diagnostics that convert into a system-wide stimulus, encouraging adaptation. Observation and diagnostic functions are not centralized, but spread across the system; adaptation is a process where the sub-elements individually and collectively observe and process, pulling the system along with

it on the basis of large numbers of individual decisions. Observational approaches such as active observation with pulsing tied to an effective diagnostic system often are superior than passive ones which miss many of the turning pieces and parts of rival systems, opening themselves up to slower adaptation, decreased performance, and threatening success and survival.

Inductive-holistic approaches provide a way to address complexity by focusing on the system over the parts, purposely looking for change by placing significant emphasis on active observation, near-real time diagnostics followed by decisive action to exploit fleeting opportunities. Once any approach is put into action the problem changes, the affected system adapts, and previous understanding fades away. Informed by complexity science, new technology and experience from war, an improved method to actively pursue change is now possible that calls for a heavy emphasis on active observation, near-real time diagnostics, and rapid counteraction that pursues and eliminates enemy adaptation.

## **CHAPTER 4: OPERATE TO KNOW**

### **Introduction**

Today's doctrinal emphasis of developing, and then executing, extensively detailed plans using the joint operational planning process (JOPP) to achieve decisive action may become less useful and even counterproductive, especially interventions against highly adaptive complex adversaries. Planning may only serve the purpose of getting the force focused to an operational area and setting conditions for aggressive probing and knowledge building. Without active observation and diagnostic processes in place tied to responsive decision-making, enemy adaptation may go undetected and unanswered, and the enemy may out-turn or gain the initiative by rapidly changing in unexpected and effective ways rendering a plan ineffective in the first few moves. In response to the dynamic nature of complex adaptive systems, the joint force commander will look to deploy an aggressive knowing capability consisting of active observation with pulsing and continuous diagnostic feedback to enable dynamic military decision-making. End states, objectives, and lines of operation can be defined or adapted as knowledge increases. This process is called Operate to Know (OtK). OtK is about balancing operations and intelligence to use a system of nonphysical and physical capabilities that actively hunt the enemy for the purpose of understanding and adapting to restore U.S. decisive operations to a position of dominance in twenty-first century contingency and conflict.

## The Balancing of Joint Warfighting Functions

Today, new forms of warfare are emerging driven by information and communications technology. Wartime operational pressure, stemming from the need to know and find hidden adversaries rapidly and accurately, accelerated an explosion in tactical intelligence and operations methods and technologies.<sup>1</sup> Over the last thirteen years, the military services and joint multi-national forces have fostered expansive growth of tactical intelligence capabilities by placing unprocessed high bandwidth sensor feeds and processing capabilities into tactical units, leaving it up to them to build their own local intelligence picture.<sup>2</sup> In Iraq and Afghanistan, and continuing today, intelligence has evolved from a static planning and assessment capability to an equal pillar of action with operations. At the tactical level, units have come to understanding, albeit temporarily and incompletely, using two major capabilities—intelligence to detect and locate, and operations to deliver appropriate actions that cause the adversary to become visible.<sup>3</sup>

Doctrinal operational thinking, inheriting weaknesses of its German army forbearer, dominate joint operational art, design, and planning, even though doctrine recognizes the characteristics of complex adaptive systems (hard to predict, hard to understand, changing and adapting, subject to extreme behavior).<sup>4</sup> The joint force has

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<sup>1</sup> House Permanent Select Committee on Intelligence, *Performance Audit of Department of Defense Intelligence, Surveillance, and Reconnaissance* (Washington, DC: House Permanent Select Committee on Intelligence, April 2012), i-iv.

<sup>2</sup> Michael T. Flynn, “Employing ISR: SOF Best Practices,” *Joint Forces Quarterly*, issue 50, Third Quarter (2008), 56-61.

<sup>3</sup> Drew Cukor, *Operate to Know: A Proposed Marine Corps Operating Concept for Intelligence and Operations* (Washington, DC: Unpublished, 2013), 6.

<sup>4</sup> Martin van Creveld, *Fighting Power German Military Performance 1914-1945* (Fort Leavenworth, KS: Command and Staff College, 1983), 144-149.

been hesitant to rebalance and change its doctrinal operational thinking, and is reluctantly adopting, in piecemeal fashion, the tactical innovations in intelligence and operations to the operational level. Operational planning using a linear approach consumes enormous energy and requires large staffs. The outputs of planning are considered so comprehensive and veridical that once operations begin, joint forces execute from these initial assessments and may only periodically change them. During operations, per doctrine, the intelligence surveillance and reconnaissance (ISR) focus becomes “direct support of current and future operations,” and the assignment of the majority of collection resources go to targeting and force protection instead of building knowledge of the enemy and environment.<sup>5</sup> In the course of planning or operations, when new information comes in, planners more often view it deductively, accepting or rejecting each piece on the basis of doctrinally provided or individually developed deductive-reductionist models, instead of looking for how each new piece contributes to an understanding of the whole.

Today’s joint model for understanding emphasizes rigorous design and planning and periodic reevaluation based on staff review, not dynamic, continuous feedback.<sup>6</sup> Fire and maneuver are ingrained into joint operational thinking, dominating every aspect of warfighting—determining how the joint force fights in war, how it will experiment, and what investments and training will receive funding. The dominance of fire and maneuver flows from the evolution of warfare through the twentieth-century that has engrained a view that intelligence is less important than operations, and fire and

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<sup>5</sup> U.S. Joint Chiefs of Staff, *Dictionary of Military and Associated Terms*, Joint Publication 1-02 (Washington, DC: Joint Chiefs of Staff, November 8 2010, as amended through June 15, 2013), 141.

<sup>6</sup> U.S. Joint Chiefs of Staff, *Joint Operations*, Joint Publication 5-0 (Washington, DC: Joint Chiefs of Staff, August 11, 2011), A1-A9.

maneuver are the defining elements of the operational art. The last thirteen years of combat operations suggest the necessity of a revised order to meet a threat construct that has evolved since the end of the Cold War.

Today, the U.S. experiences after the initial invasions in Operations IRAQI FREEDOM and ENDURING FREEDOM have lain bare the limitations of the fire and maneuver dyad in the current operating environment. Thirteen years of persistent operations in Iraq, Afghanistan, and elsewhere have yielded many important lessons for the United States and its adversaries. Adversaries neutralize American superiority in fire and maneuver by hiding and remaining untargetable—avoiding open battle, seeking instead to make the environment inhospitable for U.S. forces, driving them to fortified enclaves, marginalizing their influence, and placing them on the defensive. The United States discovered that overmatch in fire and maneuver has not cleared a path to victory.<sup>7</sup> Experience from operations in Iraq and Afghanistan demonstrate that it is in the warfighting functions of intelligence, fire and maneuver—operations and intelligence—that the promising contours of a solution to restore decisive operations lies.

Mirroring the preceding evolutions of warfare, a new set of imperatives is emerging. Hard to predict asymmetric actions from complex adaptive systems have proven effective against the U.S. overmatch in conventional capabilities. This trend is worsening, threatening not just parts of the joint force, but the viability of conducting joint operations at all. Asymmetric actions, such as sustained precision direct and indirect fires, air defense systems that limit ISR, overwhelming numbers of fleeting targets such as small boats, rocket launchers and infantry, deeply buried underground

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<sup>7</sup> Drew Cukor, *Operate to Know*, 1.



targets, and targets embedded in populations, used in various combinations increasingly have the potential to prevent the joint force from projecting power into a semi-permissive or hostile sphere and conducting decisive operations.<sup>8</sup>

Proficiency at dispersing, adapting, and employing asymmetric capabilities gives an adversary an advantage the joint force cannot easily overcome using a linear-deductive-prescriptive approach. Asymmetric tactics and technology increasingly favor the defense, challenging offense-oriented U.S. joint forces and limiting their effectiveness. The USMC and the Defense Intelligence Agency (DIA), under the leadership of LTG Mike Flynn, were the first to propose a joint operating concept called OtK. OtK recognizes the shift in warfighting towards knowing to enhance planning and execution. Besides establishing the conceptual framework for stitching together today's intelligence methods and critical sensor and processing technologies for coordinated advancement, OtK is based on bringing together operations and intelligence. This merging of intelligence into a triad with fires and maneuver is a new combined arms system of the twenty-first century. Skillfully combined, such a triad can result in the reinvigoration of both fire and maneuver by placing a premium on knowing and finding so they become more highly informed, precise, and effective.

Operations and intelligence conduct actions to purposefully spike for an enemy response using physical and nonphysical means, then exploit emergent opportunities. Continuous OtK operations enable adjustment of fires, maneuver, and other forms of influence to exploit further opportunities that are exposed through action. Each action generates more knowledge and many times the sole purpose of the action is to generate

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<sup>8</sup> Paul K. Davis, *Looming Discontinuities in U.S. Military Strategy and Defense Planning* (Arlington, VA: Rand Corporation, 2011), 20.

knowledge. What emerges are two integrated processes: one that generates knowing and finding, and the other that directs action. Operations pulse the environment using maneuver to know, fire to know, feint to know, and develop to know, to elicit an enemy reaction, target it and learn more for follow on actions.<sup>9</sup> Intelligence collects the enemy signatures from an operations pulse and, using massed and layered sensors, combines the processed signatures with information collected from a range of other sources (interagency partners, allied security forces, local populations, etc.) to build a dynamic knowledge picture for system-wide use.

### **Operate to Know**

Complex adaptive systems consist of a web of interconnected sub-elements, which collectively produce unique properties; chief among them is the ability to generate outputs far in excess of their individual parts and, when under stress, adapt in surprising ways. But how and in what ways is hard to know and predict. When two complex adaptive systems compete for some advantage, they become locked or coupled and the actions of one affect the other in unexpected ways.<sup>10</sup> Both bring an initial competitive strategy to the first encounter and as the strategies interact the competing systems change in ways that neither side necessarily has control over, immediately changing the situation, combining to form new problems and in turn further change the actions of the contending sides. Some prediction is possible, especially at first, and initial planning can capture this. Branch plans and sequels are sometimes effective instruments to cope with real-time change when it is possible to foresee and then plan for adversary adaptation.

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<sup>9</sup> Drew Cukor, *Operate to Know*, 2.

<sup>10</sup> Robert Axelrod and Michael D. Cohen. *Harnessing Complexity: Organizational Implications of a Scientific Frontier* (New York: The Free Press, 1999), 75.

Branches and sequels, however, only cover so many moves up to a certain point into the future. Coping with environmental or adversary change usually rests upon first observing the change by establishing baselines and looking for anomalies and then reacting to them. Passive approaches that wait for adaptation can miss the adaptation altogether or only follow the enemy, never catching up. Purposely seeking out adaptation from the start by actively interacting with the rival system can both spur friendly change and, importantly, permit the opportunity to influence the adversary's adaptive process in favorable ways.

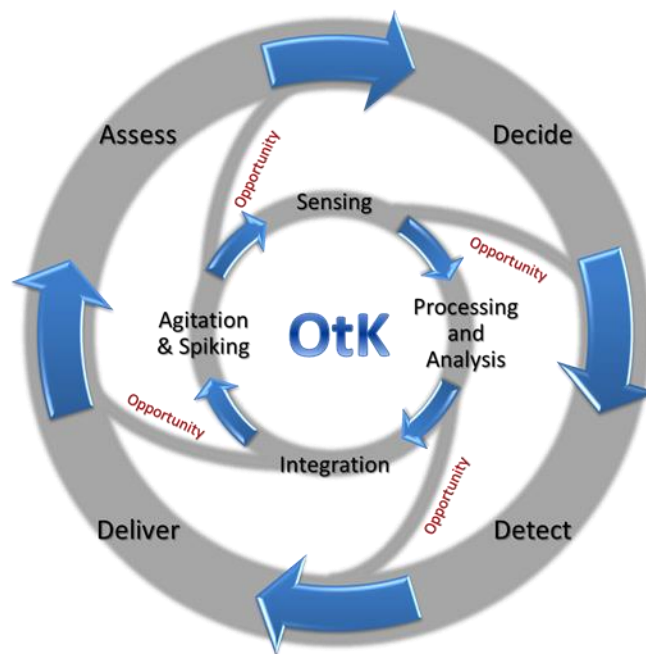
Pulsing the adversary system to cause a spike in its activity is a continuous process meant to build knowledge. Pulsing the environment or an adversary system may not reveal much at first. But as it repeats, beginning with broad energy when little is known and then following up by employing narrow energy, details emerge, and with finer focus, more is exposed.<sup>11</sup> As OtK continues over time and opportunities emerge and actions are taken, knowledge of the adversary system grows. But this knowledge always remains incomplete because as action is taken, the enemy changes, often in unexpected ways. Because of this, OtK must be a continuous process, focused on the key elements of the enemy system, building knowledge in the midst of an evolving situation. In the continuous back and forth between pulsing and rapid action, opportunities will surface and, depending on the best options for success at that time, the joint force will quickly exploit or hold them for later.

While the OtK cycle builds a knowledge picture on the enemy and environment, intelligence and operations watch for opportunities that spin out of the OtK dynamic to

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<sup>11</sup> Drew Cukor, *Operate to Know*, 17.

conduct deliberate operations permitted by the mission.<sup>12</sup> Operations, fully immersed in the situation and having directly shaped the knowing and finding, orients the force for these events that can now be launched supported by a constantly updated picture of the adversary and environment.<sup>13</sup> In this way, operations and intelligence are part of an orchestrated strategy to pulse for a response, collect signatures, and then integrate them into a continuous picture to enhance battlespace awareness.<sup>14</sup> This repeating process ultimately contributes to the development of a constantly updating picture of the enemy and environment that operational and tactical elements across all elements of the system can see and react to. (See Figure 1.)



**Figure 1: The OtK Dynamic**

**Source: Drew Cukor, *Operate to Know: A Proposed Marine Corps Operating Concept for Intelligence and Operations* (Washington, DC: Unpublished, 2013), 7.**

<sup>12</sup> Drew Cukor, *Operate to Know*, 7.

<sup>13</sup> Ibid.

<sup>14</sup> Ibid.

OtK fills in the critical space of near-real time knowledge building that operational design, because it is a static staff construct, cannot meet. OtK provides a way to insert continuous knowledge on the enemy and environment into an operation. It is less about formulating a hard theory of what is going on and then executing against it, and more about building an initial inference that changes as conditions do. OtK organizes the physical structure of the operation where active knowing is an element of design.

### **Incorporating OtK into Joint Warfare: Process and Intellectual Skills**

OtK has the potential to improve a number of existing joint frameworks for operations, enhancing planning, execution, and assessment. Many of today's processes for planning, execution, and assessment were conceived in an age before technical and operational advancements permitted the ability to peer into the operational battlespace and make sense of complex interactions using pulsing, diagnostics, and continuous feedback. These capabilities exist in rudimentary form today and have yet to be brought together into a cohesive concept.

### **Improving Operational Design and Planning**

Current joint doctrine advises that planners “blend operational art, operational design and joint operational planning process (JOPP) in a complementary fashion [to produce an operational plan].”<sup>15</sup> One of the key purposes of the joint triad of operational art, design, and planning is to create understanding, reduce uncertainty and formulate

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<sup>15</sup> U.S. Joint Chiefs of Staff, *Joint Operation Planning*, Joint Publication 5-0 (Washington, DC: Joint Chiefs of Staff, August 11 2011), I-5.

expert operational plans. To achieve understanding, joint doctrine lays out a methodology for planners to use as a baseline to help them frame the problem (design) and then problem solve (JOPP). Beginning first with design, planners evaluate conditions using thirteen elements to help form an approach to an operation or campaign.<sup>16</sup> Design includes consideration of military end states, center of gravity, lines of operation and effort, and other elements the joint force needs to consider, and then JOPP translates these broad operational elements and overall approach into detailed plans and orders for execution.<sup>17</sup> The intellectual skills that define design—critical discussion, discourse, shared visualization of operational problems by synthesizing different perspectives and ideas, looking holistically at a problem and looking for a shared starting hypothesis—are not fully addressed in doctrine. Instead, the commander is to use his insight and experience to derive insights. This appears to be both a hold over from German doctrinal concepts—the exaggerated role of the commander in decision-making—and a means to avoid the challenge of describing the processes and intellectual mindset necessary to conduct true design thinking. The major contribution of design may be that it forces a doctrinal thinking space before planners start JOPP to generate orders.

OtK allows planners to immerse themselves in near-real time data and formulate design elements as conditions evolve. Design becomes art—a true combination of process and intellectual skills to develop guidance and produce short, open-ended orders to start the physical and nonphysical pulsing. What emerges is an organized process for thinking, feeling, prodding, more thinking, and acting and then doing it over again—continuously throughout an operation or campaign. As sensors uncover the near-real

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<sup>16</sup> U.S. Joint Chiefs of Staff, *Joint Operation Planning*, iii-1.

<sup>17</sup> Ibid.

time situational picture, military end states, objectives, and decisive points will emerge and be modified as needed. Operations and intelligence will function uninterruptedly together, overseeing pulsing and receiving updates from a dedicated intelligence organization to process, analyze, and integrate the signatures coming off the sensors. During design, operations and intelligence staff will develop goals, objectives, and end states based on the joint force commander's intent, which is shaped by the results of initial sensing and pulsing of the environment and enemy. The joint force commander and the staff become a system—continuously sensing and analyzing in order to assess and adapt.

## **Summary**

The gradual evolution of commercial technology and military capabilities for knowing and finding has brought to the battlefield improved ways to systemically know and find within an operating environment. These capabilities, when balanced with operations, offer important operational advantages that may offset the hard to detect asymmetric challenges of complex adaptive systems. Similar to how the operational integration of the radio, mechanized vehicle and airplane ushered in tactical and operational breakthroughs in WWII Germany, the balancing together of operations and intelligence offers important new possibilities to counter hidden adversaries, asymmetric responses to U.S. modes of warfare and reopen decisive operational success that is hard to come by today.

As operations and intelligence work together seamlessly, the back and forth between knowing and action, between intelligence and operations has the potential to

uncover many aspects of the illusive adversary network.<sup>18</sup> In this way, each warfighting function improves by integrating more closely with intelligence. The end state remains the same: to accomplish a mission. Action is required to impose the joint force's will on an adversary and accomplish a mission, but a more appropriate balance where intelligence supports operations and operations supports intelligence can allow the joint force to be more effective and give it a marked advantage.

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<sup>18</sup> Drew Cukor, *Operate to Know*, 5.



## **CHAPTER 5: CASE STUDY ON OPERATE TO KNOW—HISTORICAL 1942 DIEPPE AND TWENTY-FIRST CENTURY DIEPPE**

### **Introduction**

The raid on the French coastal town of Dieppe in August 1942 serves as an example of how the Allies unintentionally initiated an operation designed for one outcome that actually had greater influence and benefits in its total failure than it would have had if it had been successful. With limited doctrinal guidance, a primarily Canadian force executed a division size amphibious raid primarily to demonstrate the Allied commitment to the Soviet Union while also tempering U.S. enthusiasm for a cross-Channel invasion. The 1942 Dieppe amphibious task force was a blunt and blind instrument equipped with extensive fire and maneuver capabilities necessary for a division-size raid on a hostile shore, but lacked any details or means of developing specifics on the enemy situation on the ground. As was common then and now, the force compensated for the lack of intelligence by moving to contact, leading with its chin, discovering what was in front of it by physically bumping into the enemy using maneuvering infantry.<sup>1</sup> Dieppe represents an attritionist-linear style approach using mass to overpower a defender.

From a linear deduction-reductionist perspective, Dieppe was an abject failure: simple structured approach, inconsequential objectives, rigid end state, resulting in massive casualties and a humiliating retreat. From a non-linear inductive-holistic perspective, however, Dieppe was an important success, though needlessly costly.

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<sup>1</sup> Terence Robertson, *Dieppe: The Shame and Glory* (Boston: Little, Brown and Company, 1962), 400.

Dieppe provides a valuable example of active probing with feedback and adaptation. Viewed from this perspective, the raid delivered to the Allied forces valuable political, operational, and strategic outcomes. This chapter will use the historical 1942 Dieppe raid to compare and contrast two approaches to warfare. The 1942 raid represents a twentieth-century mode driven by a conventional-deductive understanding. Examining the raid from a twenty-first century concept will show how non-linear, inductive-holistic knowing drive the operation. This comparison demonstrates basic equipment, processes, and intellectual elements necessary to implement an aggressive OtK capability consisting of active observation with pulsing and continuous diagnostic feedback to enable dynamic military and policy decision-making.

### **The Historical 1942 Dieppe Raid**

Late winter of 1941 and well into 1942 was a bleak time for Britain and the Soviet Union. The Wehrmacht controlled all of Western Europe and its opening assault into Russia wiped out three Soviet armies, 62 Soviet divisions and captured or killed over 2 million Soviet soldiers. The Wehrmacht controlled over 48 million Soviet citizens, almost half the population of the Soviet Union at the time. In North Africa, Rommel was pummeling the British who were fighting to keep control of key parts of North Africa. The British Army's biggest loss was Tobruk in June 1942, which fell to the Germans with 33,000 Allied soldiers taken prisoner. By mid-1942, the Wehrmacht opened up a second front in Russia aimed at eliminating Stalingrad. Hitler contemplated finishing operations in Russia by late summer 1942 and then moving Wehrmacht troops in Russia to southern France and invade Spain and Portugal by early 1943. Hitler's Operations

FELIX and ISABELLE were to place the Wehrmacht within striking distance of the American continent via the Azores, Cape Verde and the Canary Islands.

The United States entered the war in late 1941 and, in concert with a Germany first strategy, pressed for an attack into Western Europe. The Americans proposed Operation SLEDGEHAMMER to gain a lodgment on the continent somewhere in France, build up forces, and attack into Germany. The Soviets pressed the Allies to open up a second front in Europe. Great Britain opposed a cross-Channel invasion because neither Britain nor the United States were ready for such an operation, regardless of what the Soviets demanded. Thus, the political conditions of 1942 demanded some form of action against Germany on the continent to mollify the Soviets. In the face of American and Russian pressure, Great Britain proposed a compromise strategy of air strikes and limited raids on the continent. The British Combined Operations Headquarters had already overseen five small-scale commando raids against coastal sites along the French and Norwegian coastline with limited success, but under Churchill's direction, the staff organized a larger operation of opportunity.<sup>2</sup> Initially called RUTTER and later JUBILEE, the Combined Staff selected Dieppe as the target of a raid, and by May 1942 the 2nd Canadian Division of the 1st Canadian Corps was conducting ship-to-shore training on the Isle of Wight in the English Channel with an anticipated launch sometime in June or July 1942.

Operation JUBILEE was plagued by problems from the start. Operations security for JUBILEE was lax and prompted the Germans to expect an upcoming raid in and around Dieppe. Added to this was British, American, and Russian official hinting to the

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<sup>2</sup> Darril and George Fosty, *Where Brave Men Fall: The Battle of Dieppe and the Espionage War Against Hitler* (New York, NY: Stryker-Indigo, 2013), 99.

media about an upcoming large-scale operation that led to international headlines several days before the raid.<sup>3</sup> The Germans responded by reinforcing the area with additional troops, increasing patrols, building obstacles, and marking sectors of fire for defensive mortar and artillery support.

The nine-hour raid began early on 19 August 1942 and consisted of six thousand Canadian and British soldiers, and a few Americans.<sup>4</sup> The Allied planners established several objectives, including targeting anti-ship coastal batteries, seizing bridges, and holding key terrain until ordered to return to the beach and re-embark.<sup>5</sup> Because the Germans expected an attack, when the first assault waves of British commandos and Canadian forces moved toward their landing sites, either along the mile long beach or the flanks, most were spotted while they were still in the water.<sup>6</sup> Almost all the landing force elements started taking accurate machine gun fire before they could disembark from their landing craft and thirty-to-forty percent of the assault force was lost before landing.<sup>7</sup>

The Allies sent twenty-seven tanks ashore, but only two made it off the beach because the beach gradient and obstacles prevented forward movement.<sup>8</sup> The Royal Air Force executed a weak and inaccurate aerial bombardment, naval gunfire support was ineffective and poorly coordinated, and the element of operational surprise, critical to the

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<sup>3</sup> Fosty, *Where Brave Men Fall*, 130.

<sup>4</sup> Brian L. Villa, *Unauthorized Action: Mountbatten and the Dieppe Raid*. (Ontario: Oxford University Press, 1989), 1-2.

<sup>5</sup> R.W. Thompson, *At Whatever Cost: The Story of the Dieppe Raid* (New York: Coward-McCann, Inc. 1956), 206-208.

<sup>6</sup> Villa, *Unauthorized Action*, 14-15.

<sup>7</sup> Ibid.

<sup>8</sup> Ibid.

success of an amphibious assault, had been lost before the mission began.<sup>9</sup> General John H. Roberts, the raid force commander, had no communications and, unaware that the force was struggling to get off the beach, continued to send pre-assigned landing waves ashore and even committed the reserve.<sup>10</sup> He was unaware that units crowded onto the beach, exposed to German fire. At 1100, the planned withdrawal began under heavy fire with units suffering casualties along the way as they returned to the ships.<sup>11</sup> The results were devastating. More than half the force was killed, wounded or captured.

On the British side, Churchill silenced internal criticism and characterized the raid as a reconnaissance in force to downplay the fact that none of the objectives were achieved.<sup>12</sup> In September 1942, facing a major political inquiry, Churchill informed the House of Commons that he had authorized the raid to gain information to support upcoming amphibious operations.<sup>13</sup> It was not until after the war that acknowledgement of the high casualties and a summary of the horrific scenes came together into a meaningful narrative. In the U.S. and British media, the raid was portrayed as a success.<sup>14</sup> The Germans used the scenes of destruction to mock the Allies and showcase the strength of the Wehrmacht, the weakness of Allied troops, and the invincibility of German coastal defenses.<sup>15</sup>

The Dieppe raid demonstrated that the Allies had only a basic idea of how to conduct ship-to-shore movement on the scale needed to conduct a full-scale cross-

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<sup>9</sup> Villa, *Unauthorized Action*, 14-16.

<sup>10</sup> Fosty, *Where Brave Men Fall*, 156.

<sup>11</sup> Robertson, *At Whatever Cost*, 362-378

<sup>12</sup> *Ibid.*, 167.

<sup>13</sup> *Ibid.*, 172.

<sup>14</sup> *Ibid.*, 167.

<sup>15</sup> Villa, 3.

Channel invasion and succeed.<sup>16</sup> The knowledge gained from Dieppe in this area proved invaluable.<sup>17</sup> For two years after the raid, Allied planners studied the lessons from Dieppe to prepare for Operation OVERLORD.<sup>18</sup>

The Allies learned to avoid a frontal assault against a heavily defended enemy port, the criticality of sustained fires throughout the assault, the need for highly trained personnel to man the landing craft, as well as critical details such as the type of armor landing craft needed, tread and the maximum amount of weight per square inch that tanks could displace to get off French beaches.<sup>19</sup> They gained an appreciation for the types of sea states the forces could handle during offload, and adopted one fuel type for all Allied equipment because resupplying multi-fuel platforms from the sea was unnecessarily complex.<sup>20</sup> The Allies also learned how the Germans intended to defend from the beach and formulated tactics to counter German defensive procedures.<sup>21</sup>

The Dieppe raid achieved significant deception effects by convincing Hitler that a cross-Channel invasion was imminent, a realization that was contrary to his 1942 estimates of Allied combat capabilities and introduced significant uncertainty into his view of Allied intentions. After Dieppe, Hitler moved eight additional divisions into France to beef up the Western Defense System.<sup>22</sup> The Dieppe raid and Wehrmacht setbacks in Russia combined to scuttle Hitler's plan to invade Spain and Portugal.

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<sup>16</sup> Robertson, *At Whatever Cost*, 406-409.

<sup>17</sup> Ibid., 408-409.

<sup>18</sup> Ibid.

<sup>19</sup> Ibid., 406-407.

<sup>20</sup> Ibid.

<sup>21</sup> Ibid.

<sup>22</sup> Fosty, 164.

Dieppe also successfully hid the Allied buildup associated with the upcoming Operation TORCH, the invasion of French North Africa. While the Germans were fixated on understanding the Allied rationale for the Dieppe attack, British and American transports were moving equipment and personnel to staging points for Operation TORCH.<sup>23</sup> The Germans picked up on these movements, but attributed them to the Dieppe raid.<sup>24</sup>

As a political expression, Dieppe was an unfortunate expedient for the Allies. But as a probe, as unintentional as it was, it proved an effective way to inductively sample the environment to gather knowledge on how to conduct an amphibious assault against German fortifications for second-front planning.<sup>25</sup> Quite unexpectedly, the first major Allied assault against Hitler's Fortress Europe had important operational and strategic consequences that were unforeseen by the Dieppe planners. Given these favorable outcomes for the Allies, could it be possible to reconstruct the raid, but with strategic-operational intentions as the basis for the operation? What would a Dieppe raid look like in the twenty-first century?

### **Twenty-first Century Dieppe**

By using the basic outline of the 1942 Dieppe raid and updating it with twenty-first century tactics and equipment, this section will highlight important elements of the OtK mode of warfare and call attention to the process and intellectual elements necessary to realize it. Taking the same premise from 1942 Dieppe, the modern force, Dieppe 21, seeks to employ force against a hostile shore for larger political purposes, specifically to

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<sup>23</sup> Fosty, *Where Brave Men Fall*, 130.

<sup>24</sup> Ibid.

<sup>25</sup> Ibid., 175.

deceive Hitler on the timing of a cross-Channel invasion and cause him to commit his troops and resources to a costly defense. In addition, like 1942 Dieppe, Dieppe 21 would also be tasked to test enemy defenses and capabilities. Unlike 1942 Dieppe, Dieppe 21 would be purposely organized to shape operational-strategic conditions within the theater.

Like the nine-hour 1942 Dieppe raid, Dieppe 21 would be a massive probe across a wide front. Facing a situation like Dieppe today, U.S. military and political decision makers would use military forces differently to achieve political and strategic advantages. Instead of employing an infantry division as a probe, the force would employ different and less costly capabilities. However, structuring modern forces for knowing and influencing would require a different staff structure, command and control arrangements, and additional capabilities. Functioning as a knowing organization, Dieppe 21 would conduct the operation to inductively discover its way through the conditions the enemy presented and would be less reliant on predefined and detailed military strategy, approaches, priorities, objectives, and end states. Intent on first knowing the enemy, Dieppe 21's essential tasks would focus on knowing and understanding through pulses against the enemy system. This pulsing is intended to expose new information and understanding that, in turn, leads to exploitable opportunities. Political and military leaders will use the raid force to pry, test, understand the environment, and then take decisive action against key elements of the enemy system. Political and military leaders, unable to describe what they want at first, but immersed in the fine-grain details of the Dieppe 21 operation, will gradually discover what they want as the pulses cause the situation to become clearer and leaders will lever up and down on the military instrument



to achieve the political outcome they are looking for. As a result, the Dieppe 21 mission would begin without a clear understanding of what to accomplish or how the intervention should end.

A robust OtK-equipped joint naval expeditionary force, stationed safely across from a hostile shore and providing a continuous offshore presence, would offer a pulse, soak the area with sensors and a rapid response capability to know and find the enemy while also exploiting key opportunities—rapidly, accurately and repeatedly. As the OtK mission develops, and information and knowledge highlights key elements, leaders can shift and adapt the vital correlation of ends, ways, and means to match the evolving nature of the operational-strategic environment. In 1942 Dieppe, this was impossible to achieve—the force was blunt and blind and once launched it could only do one mission—but for Dieppe 21, it will dominate and all resources of national power will draw together to enable it.

To operate in this manner, the joint force must adapt its processes and re-conceptualize its intellectual skills towards knowing and understanding—it must think and act as a complex adaptive system in nonlinear, inductive-holistic ways. This naturally leads to the structures of OtK and the intellectual skills necessary for operating without requiring necessarily predefined military end states, objectives, and decisive points. Necessary today are joint force structures and enhanced intellectual skills to uncover opportunities with speed and define objectives in near-real time in a continuous receive-respond, collect-pulse connection between intelligence and operations—developing a near-real time situation picture to enable rapid decision-making.

As the Dieppe 21 expeditionary task force moves towards the operational area, analysts and planners assemble preexisting and new incoming information from sensors and other sources. This preexisting information includes the history, disposition, capabilities, and interactions of the enemy and other networks in the area. This first assessment results in directing sensors to areas of interest to obtain a near-real time intelligence picture of enemy locations and disposition. Short, open-ended orders set in motion OtK and the physical and nonphysical pulse and probe tactics.

Sensors are massed and layered based on knowing requirements developed by intelligence and operations working in close coordination. The task force places a mix of national, joint, coalition, and organic sensors above the area of interest for passive collection of patterns of human activity. The high definition raw data from the sensors is sent to processing and analysis sites in the United States where analysts study the live feeds from the sensors 24-7, and input tracks and entities into the Joint Task Force's (JTF) C2 system for use by forward-deployed JTF intelligence analysts. A large JTF operations and intelligence signature fusion branch aboard ship monitors the tracks and entities flowing into their C2 systems from the U.S. based processing and analysis and fuses together multiple tracks and entities that come from a wide range of different sensors. The tracks and entities layer on top of human activity, enabling JTF analysts to fuse different sensor signatures together, identify them as important or innocuous, and disseminate over the C2 system the important enemy and environmental features for JTF-wide awareness and use. The continuous sensing, processing, and analysis enterprise produces a near-real time, interactive picture on the JTF's C2 system of the operating

environment showing resolved entities and tracks as they move about their patterns of normal life.

This passive collection process will result in an outline of very basic characteristics. The dynamism that OtK seeks to create rests on passive observation to first establish baselines of activity, then active pulsing with near-real time diagnostics and system-wide feedback to spot anomalies that become visible by comparing them with the baseline.

From its forward afloat base, Dieppe 21 can use its technical means to explore the environment by pulsing with nonphysical or physical capabilities. Pulsing ranges from nonphysical means such as cyber and electronic attack to traditional physical means such as precision raid and strike missions. Dieppe 21 will inject broad pulsing into the enemy battlespace to perturb, agitate, and expose a hidden enemy. This is an operations and intelligence partnership intended to put energy into the target environment, get it to respond, and collect information to turn it into knowledge of the enemy and environment for close-in, precision decision-making. The goal is to expose the enemy and permit collection of information. As this occurs, the global intelligence network actively seeks to detect and exploit the signatures, and identify opportunities to target enemy vulnerabilities.

As the active pulsing continues, the additional sensor data provides an emerging picture that exposes more and more of the hidden enemy. Deploying additional point-level sensors into exposed areas adds greater fidelity to the overall picture. Like 1942 Dieppe, Dieppe 21 also requires a robust probe to convince Berlin that a cross-Channel invasion is likely soon. Expressly organized to know and influence, the JTF's first phase

of Dieppe 21 inductively discovers the enemy system using stand-off means as opposed to starting with predefined and detailed deductive military objectives and end states. The decisive phase of Dieppe 21 phase can now use the continuous enemy situation picture and environmental knowledge to probe using precision swarm formations to uncover hidden elements of the enemy system and attack them for the purpose of gaining some advantage and more intelligence.

Continuous near-real time signature analysis from sensing and pulsing are sent to swarm formations as they move ashore to their objectives. Swarm formations are small teams operating semi-autonomously with abilities to use kinetic and non-kinetic capabilities to influence activity in the battlespace. Swarm teams infiltrate onto their objectives using precision feeds after precision fires have eliminated the majority of the opposing threat. When directed, swarm teams can mass to provide strength at a key point and time.<sup>26</sup> The near-real time picture allows intelligence and operations to shift the swarm forces based on the desired effect needed. As each swarm team strikes its assigned targets, the teams collect information from each objective site, which the JTF uses to build its knowledge of the enemy and environment. The continuously improving picture coming from the spikes in the enemy system as each swarm probe strikes its target allows the JTF to launch additional high payoff swarm strikes. Rapid exploitation of captured documents and interrogations uncover further details, leading to redirection of sensors, opening up new targets for strike. Instead of using thousands of forces to

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<sup>26</sup> Swarm teams are small enough that their operating signature is low, but capable enough to bring significant combat power to bear and survive in a hostile environment. Swarm teams place energy into the environment to help triangulate critical elements on the battlespace and respond to fast-closing opportunities that surface from the pulse and soaking.

attack blind into built up German defensive fields, informed by a continuously updating and interactive picture, swarm teams strike key nodes with precision.

The process is repeated—massing and layering sensors, pulsing to spike an enemy system, narrowing pulse and sensing on key targets, then taking action while continuing to observe to gain knowledge on the enemy network—all intended to build layers of information as part of an orchestrated strategy to enhance battlespace awareness and the effectiveness of the system-wide probe. By implementing operations and intelligence procedures that actively hunt the enemy for the purpose of knowing and finding, the JTF is able to raise up the enemy's signatures while minimizing its own in order to develop knowledge necessary for precision probing, strike and swarming operations.

Dieppe 21 using OtK continuously generates real-time knowledge of the environment and adversary, not just in the initial phases but throughout the operation. OtK will operate continuously with operations and intelligence overseeing pulsing and include a dedicated intelligence organization to process, analyze and integrate the signatures coming off the sensors.

### **The Processes and Intellectual Skills Needed to Achieve OtK**

Similar to 1942 Dieppe, U.S. joint forces deploy today without the ability to comprehensively see into the expeditionary battlespace, process enemy information in real time, or provide a live-enemy-situation picture. As in 1942, joint expeditionary forces operate nearly blind—relying primarily on limited theater and national surveillance capabilities to develop a meaningful picture of the battlespace. Despite fires and maneuver capabilities that enable joint forces to operate anywhere in the world, they lack the ability to influence what they cannot see. Movement, protecting forces,

controlling fires and maneuver in order to execute an operational plan traditionally has been the dominant intellectual approach.<sup>27</sup> Knowing and understanding are implied and assumed functions referenced only peripherally. In most plans and orders, intelligence is an annex representing dated information. Operational elements are organized and directed such as fire, maneuver, logistics, C2 and communications, but the task of knowing and finding is absent. This creates a pernicious effect where operations unknowingly sits on the sidelines believing intelligence will go and figure things out and then provide operations what it needs.

OtK rejects this approach and replaces it with a near real-time, continuous picture of the environment and enemy bringing together processes, technologies and intellectual skills to pulse, soak, process and analyze and then integrate the near-real time picture into planning and operations. Emergent concepts of massing and layering sensors for a range of different environments, pulsing using physical and nonphysical means supported by a system of processing, analysis and integration will mark warfare in the twenty-first century.

## **Summary**

When looked at from a linear-deductive-reductionist approach, the 1942 Dieppe raid is a story of a massive military catastrophe. The military achievements are virtually nonexistent—the raid is costly, unsuccessful, and highly embarrassing. But seen from a non-linear, inductive-holistic view, Dieppe offers important insights of an emerging form of warfare, a mode that is highly matched to complex system observation, feedback, and adaption. Dieppe was a conventional operation meant to achieve limited military

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<sup>27</sup> David Kahn, *Hitler's Spies* (Lexington, KY: DeCapo Press, 2000), 399.

objectives and to serve political-strategic ends; unintentionally it had a far-reaching influence on the course of the war. Unknown at the time, Dieppe altered German strategic calculations and provided substantial learning for Allied planners.

The operational-strategic benefits of the historical Dieppe raid offer a glimpse of what is possible today. New advances in technologies and warfighting procedures have expanded both the joint force's capability to see and make sense of what it sees. The critical lessons from thirteen years of war advise the Joint force that it must do more to know the enemy and environment and find adversary forces and capabilities.

Amorphous, quasi-insurgency rivals employ asymmetric forms of war that deny decisive targets, while engaging in a level of combat that is ultimately exhausting and unsustainable to U.S. political leadership. In this environment, military forces must function differently: to pulse to understand the environment, then take decisive action all the while being able to pace the intensity of operations to allow off-ramps for other instruments of national power to take the lead to meet national objectives. This capability will require new operations and intelligence equipment, processes, and intellectual skills at the operational level of war. Joint forces must become more precise, using near-real time knowledge. The equipment, processes, and intellectual skills of the joint force are the critical elements to make an OtK process work.

The 1942 Dieppe was a disaster because these elements were not recognized and the capabilities and equipment had not yet been invented. Even still, without OtK, 1942 Dieppe unintentionally achieved something much more than the tactical and operational capabilities could have ever laid out—critical knowledge, valuable deception benefits, important learning that were all favorable to the Allies. Instead of falling into these

outcomes unintentionally or by accident, or missing them all together, the joint force should look to institutionalize the concepts and equipment into a single, cohesive warfighting framework to raise knowing and finding as critical, fully resourced joint operational activity.



## **CHAPTER 6: CONCLUSION**

Deductive-reductionist doctrine and ever more extensive and invented commander-centric planning regimes hamper today's approach to joint operational warfighting. Complex adaptive rivals change in unpredictable ways, many times after the first act of observation, which undercuts the effectiveness of executing a military plan. Today's emphasis of first developing and then executing extensive detailed plans using JOPP to achieve decisive action may become less useful, and even dangerous, especially in interventions against complex adaptive adversaries. Extensive planning, a relic of the past to counter an enemy that was organized and structured to fight conventional high-intensity mechanized warfare, is increasingly less useful against an enemy that will rarely present itself in conventional structures.

Instead, as complex adaptive systems become more commonplace, grow in size and capability, and their range of potential outcomes become more unpredictable, new military approaches to understand and act are emerging. Heavy emphasis on active observation with pulsing, diagnostics, and counteraction that pursue (and possibly suppress) enemy adaptation offers the most promise to insure U.S. operations are decisive in twenty-first century contingency and conflict.

In response to the dynamic nature of complex adaptive systems, policy makers and military leaders will look to deploy an aggressive knowing capability consisting of active observation with pulsing and continuous diagnostic feedback to enable dynamic policy and military decision-making. Traditional military planning elements such as rigorously defined end states, objectives, intent, essential tasks, purpose, main effort and

the elements of operational design will emerge over time as knowledge increases and political and military leaders identify opportunities, create leverage, and exploit weaknesses. Equipping and organizing the joint force to handle the intense and complex processes this type of work demands, and at the same time preparing maneuver and fires for precision intelligence feeds that will alter planning, maneuver, and fires in mid stream will require extensive training and operational practice to master.

A major problem is that today's joint and service warfighting concepts, doctrine, and equipment optimize the joint force to shoot and maneuver, not to know and find. After thirteen years of locating and fighting unseen enemies by giving combat units extensive intelligence capabilities, the nation's most important joint expeditionary units continue to operate almost blind, relying on limited theater and national surveillance capabilities to see into an ever murkier battlespace.<sup>1</sup> After immense investment fighting in Iraq and Afghanistan, joint expeditionary forces operate without the ability to continuously process sensor information in near-real time.<sup>2</sup> Even with the ability to process it, the joint force still does not have a C2 system to supply a near real-time enemy situation picture to immerse planners in the details of the problem and for fires and maneuver to fight with.<sup>3</sup>

The current joint warfighting system reflects an inadequate operations-intelligence function, and is missing the equipment, processes, and intellectual capabilities to create and handle near real-time feeds. This fatal design flaw in joint U.S. doctrine is a result of the diminished standing of intelligence as a secondary warfighting

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<sup>1</sup> Drew Cukor, et al, "Operate to Know" *Marine Corps Gazette* Issue 98, Volume 4 (2014): 57-62.

<sup>2</sup> Ibid.

<sup>3</sup> Ibid.

function. For the Germans, offensive operations did not require detailed intelligence: aggressive action could clarify any situation and the will of the commander could pierce the fog of war. While German commanders saw the advantages a vibrant intelligence function provided their forces, they were unwilling to pay the price for the capability.

For generations in Western militaries, the cult of decisive warfighting characterized by an emphasis on fire and maneuver, the disdain towards specialist functions, and the limits of technology kept intelligence as a weaker, second tier enabling function. Intelligence was buried in appendices, annexes, and tabs far behind perceived more important functions, which consumed the commander's attention such as movement, protection, fires, and maneuver.<sup>4</sup> Up until recently, intelligence has delivered smaller contributions and capabilities that did not offer clear alternatives or benefits to kinetic modes of operations. Today, U.S. forms of warfare remain tied to kinetic-based forces attacking an enemy with often outdated information relying on the commander to adapt to the emerging situation and apply overwhelming physical-form fires and maneuver to defeat an enemy. Today's joint concepts and approaches overweight fires and maneuver in operations, a legacy construct stemming from their dominance over the course of the twentieth-century. This focus distorts the way the United States fights and conducts operations to favor fires and maneuver over knowing and finding. This is especially pronounced in joint operational planning and execution where intelligence is characterized as a product, and its delivery to planners often signals the end of collection and analysis. Joint operational intelligence must be more than static products, which reflect a linear collect and analyze model. Instead, it must transition to a continuous

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<sup>4</sup> David Kahn, *Hitler's Spies* (Lexington, KY: DeCapo Press, 2000), 399.

*thinking, feeling, prodding, more thinking, then acting* process that provides a constantly updating picture of the enemy and environment.

The diminished status is because intelligence capabilities are viewed as a *weaker* form of operations.<sup>5</sup> In the minds of operational leadership, intelligence cannot kill; therefore, no matter how much intelligence the force employs, it *cannot win* battles with nonphysical means, only fires and maneuver can do this.<sup>6</sup> The old arguments that have kept intelligence as a secondary enabler such as “unless intelligence is realized in physical form through actions [like fires and maneuver] it is just ideas, concepts and facts that exist at the cognitive level but alone and unrealized they achieve nothing.”<sup>7</sup> Or, intelligence “knowledge cannot destroy, deflect, or damage”<sup>8</sup> and “knowledge is never enough to ensure security unless there are also the power and the will to resist and forestall it”<sup>9</sup> are the expressions of a previous age that no longer match the significant benefits of its future operational-level potential.

Fighting for adversary knowledge before, during, and after a campaign by putting energy into the enemy systems to expose them is set to become a key part of warfare—a line of operation and effort known as systemic knowing.<sup>10</sup> The systemic knowing line of operation and effort will be mission-directed and overseen by intelligence supported by operations. A purposeful knowing campaign will emerge, where an operations and

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<sup>5</sup> John Keegan, *Intelligence in War* (New York, NY: Random House, 2003), 348.

<sup>6</sup> Ibid.

<sup>7</sup> Kahn, *Hitler's Spies*, 399.

<sup>8</sup> Ibid.

<sup>9</sup> Keegan, *Intelligence in War*, 348.

<sup>10</sup> Jason M. Brown, *Fighting for Intelligence: The Design of Intelligence-Led Operations* (Quantico, Virginia: Marine Corps University, School of Advanced Warfighting, 2008), 17.

intelligence staff will pulse the enemy using physical and nonphysical means through all phases of an operation and across the range of military operations.

A fully evolved example of systemic knowing (or OtK) is where a joint force uses its operations and intelligence staff to direct physical and nonphysical capabilities to sense, pulse, process, analyze and integrate information into a near real-time picture. At certain points, OtK will be the main effort and receive a wide allotment of operational resources to pulse and agitate across the joint operational area. When directed, OtK would transition to a supporting effort, continuing to sense and pulse, building the wider picture, but supporting the main effort achieve its objectives. While a task of the main effort may be to attack in zone, the purpose will not be to just destroy, defeat, or neutralize, but also to generate more intelligence and to know.

To achieve this and rebalance the joint force to benefit from thirteen years of war experience, a reweighting is now necessary. In the same way that the Wehrmacht evolved as a result of a rebalancing and harmonizing of physical-military capabilities, a new combined arms system is emerging where intelligence, fires and maneuver are equal pillars of emphasis and priority, blended uniquely together to generate a continuous enemy situation picture and find and target twenty-first century threats and capabilities.

Today, the ability to rapidly and accurately gain and maintain an understanding of the operating environment and to find the enemy has become one of the greatest, most sought after joint expeditionary capabilities. Unfortunately, joint operating concepts, procedures and, most importantly, acquisition investments, place a smaller emphasis on intelligence than fires and maneuver when knowing and finding matters so greatly.<sup>11</sup>

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<sup>11</sup> Cukor, "Operate to Know," 57-62.

Decisive operational level warfare requires not only deadlier munitions and longer-range mobility, but also better ways of *knowing* the environment, *finding* the hidden enemy, and *integrating* this knowledge in near-real time with operations.<sup>12</sup>

This thesis establishes a rationale for the development of a joint operating concept that places the combination of the advances in ISR and operations and intelligence integration into a larger warfighting construct to take forward into the future. Operate to Know advances the project to incorporate thirteen years of TTPs, unwritten experiences and disconnected technology and place them into one unifying, cohesive capability to center the joint force first on knowing, finding and integrating—rapidly, precisely, and continuously.

Defeating contemporary and future complex adaptive adversaries and their capabilities will require much more than extensive planning regimes, deadlier munitions and longer-range mobility, which today account for the majority of defense time, spending and priorities. The joint force needs to organize around operations and intelligence fighting together for knowing the environment, finding the hidden enemy, and integrating this knowledge in near-real time with the other joint functions. A new model is now necessary for thinking, feeling, prodding, more thinking, and acting and then doing it over again—continuously throughout an operation or campaign. This requires specialized equipment, processes, and intellectual skills to produce a continuous picture of the enemy and environment, tied to forces that can rapidly exploit emergent opportunities to generate more intelligence. The relevance of twenty-first century joint

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<sup>12</sup> Ibid.

expeditionary forces may depend on the extent to which they can know, find, and integrate.

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